Spring 2017

The Correlation Between the National Survey of Student Engagement Indicators and First Year Student Achievement, Satisfaction, And Retention

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THE CORRELATION BETWEEN THE NATIONAL SURVEY OF STUDENT ENGAGEMENT INDICATORS AND FIRST YEAR STUDENT ACHIEVEMENT, SATISFACTION, AND RETENTION

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B.S. June 1977, Old Dominion University

M.Div. June 1981, Columbia International University

A Dissertation Submitted to the Faculty of

Old Dominion University in Partial Fulfillment of the

Requirements for the Degree of

DOCTOR OF PHILOSOPHY

EDUCATION

Instructional Design & Technology

OLD DOMINION UNIVERSITY

May 2017

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ABSTRACT

THE CORRELATION BETWEEN THE NATIONAL SURVEY OF STUDENT ENGAGEMENT INDICATORS AND FIRST YEAR STUDENT ACHIEVEMENT, SATISFACTION, AND RETENTION

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The purpose of this study was to determine if the National Survey of Student Engagement indicators (NSSE), High-Impact Practices, demographic variables and non-involvement factors can significantly predict student achievement, satisfaction, and retention. The sample included data from 493 freshmen from a large public university in the Southeastern United States who participated in the National Survey of Student Engagement in 2015 and 2016. This study seeks to benefit instructional designers, educators, and educational institutions to maximize their resources and efforts to achieve maximum achievement, retention, and satisfaction.

The study concluded that achievement is highly correlated with higher-order learning, learning strategies, effective teaching practices, quality of interactions, and ethnicity. Retention is highly correlated with effective teaching practices. A positive student experience is highly correlated with quality of interactions and a supportive environment. A student being willing to choose the same school again is highly correlated with quality of interactions and a supportive environment.

These findings can guide institutions of higher learning in the use of limited resources to maximize student retention, achievement, and satisfaction. An institution can choose to focus on achievement, retention, student satisfaction, or all three outcomes, depending on the type and allocation of institutional resources.

This dissertation is dedicated to my wife, Deborah, who would not let me give up, believed in me when I did not, and sacrificed in so many ways to make this achievement possible. We both thank God for the privilege and opportunity of academic pursuit and for the ability to do so.

ACKNOWLEDGMENTS

If it were not for the diligent efforts of my advisor, Dr. Jill E. Stefaniak, and the committee members Dr. Dana Burnett, Dr. Tian Luo, and Dr. Tisha Paredes, this project would not have been possible. Their mentorship through this academic exercise has been invaluable as they made topic recommendations, edited content, challenged assumptions, refined and sharpened the study, to produce what you see. I also owe a debt of gratitude to Linda Deacon whose statistical expertise brought order and meaning from the research data.

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CHAPTER I

INTRODUCTION

Even though access to higher education has improved in the United States and enrollments have more than doubled from 1990 to 2012, there has not been a corresponding increase in higher education completion rates (Tinto, 2012). This inability for graduation rates to keep up with increased enrollment rates has been a strong motivator for schools to improve the achievement, satisfaction, and retention of their students. Almost half of students entering two-year colleges and more than one-fourth of students entering four-year colleges leave at the end of their first year (Tinto, 1993). Our educational system loses four out of every ten students who begin college and graduates only three bachelor's degree recipients for every ten entrants (Tinto, 2004). The analysis tool of the NCHEMS (National Center for Higher Education Management Systems) Information Center, found at higheredinfo.org, was used to calculate six-year graduation rates of bachelor students from 2003 to 2009, showing that the national average completion rate for that period was 55.5%.

While the growth rate for distance education has been higher than residential face-to-face classes, the attrition rate for online learning is believed to be 10 to 20 percentage points higher than for face-to-face courses (Berge & Huang, 2004). Leaders of both residential and as well as distance education programs are increasingly motivated to find solutions to retention, satisfaction, and achievement issues.

With limited financial and personnel resources at their disposal, institutions are seeking the best ways to invest their finite resource to achieve maximum benefits. Tinto (2004) suggests

that people with college degrees are much more likely to participate effectively in the governance of the nation, contribute their time and money to community service, consume fewer public services, and commit fewer crimes. College graduates also contribute more to economic growth and productivity helping to create a larger economic pie for all to share. Individuals who graduate from college with a bachelor's degree earn nearly $1 million more during their working careers than do people with only a high school degree.

> A college degree has replaced the high school diploma as a mainstay for economic self-sufficiency and responsible citizenship. In addition, earning a bachelor's degree is linked to long-term cognitive, social, and economic benefits to individuals – benefits that are passed onto future generations, enhancing the quality of life of the families of college educated persons, the communities in which they live, and the larger society (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008, p. 540).

An additional incentive for colleges and universities to improve satisfaction, retention, and graduation rates is that policymakers in many states are using retention and graduation rates as indicators of performance for higher education institutions. Policy makers at the federal level are considering linking institutional eligibility for federal student financial aid programs to institutional graduation rates (Titus, 2004).

Education has been defined as the process of cultivating a set of knowledge, skills, beliefs, attitudes, values, and character traits (Frankena, 1971). This process of education has taken many forms since Plato founded the academy in Athens ca. 387 BC, the first institution of higher learning in the Western world. A central factor in the educational process throughout the millennia, as well as contained in learning theory, appears to be the concept of interaction. Garrison

and Shale (1990) define all forms of education, both at a distance and face to face, as the interaction between the principal elements of the education process: content, students, and teachers.

The role and importance of interaction and engagement in the learning process is a much-debated topic that has profound effects on many facets of an educational institution's infrastructure and function including instructional design methods, teaching strategies, student retention, academic achievement, and student satisfaction(Anderson, 2003a). Educational research has recognized the critical role of interaction in the education process. Anderson (2003a) developed the equivalency theorem which posits that if any one of three types of interaction: student-student, student-teacher or student-content is of high quality, the other two can be reduced or even eliminated without impairing the learning experience. The work of Tinto (1998) and Kuh (2009) highlight the importance of interaction with the campus environment as a fourth type of interaction.

Given the centrality of interaction and engagement in the history of the educational process as well as in educational research, the topic of interaction continues to have a central role in ongoing instructional research and is often highlighted in solutions given to improve higher education. If all forms of education are essentially interactions between content, students, and teachers, and, given the prominence of interaction in the history of educational research and practice, then it seems appropriate that further exploration is needed to study the role of interaction and interactive theory in higher education (Kuh, 2001a). Research on college student development highlights the importance of students dedicating time and energy to educationally purposeful activities for learning and personal development (Kuh, 2001a).

It is important to note that this study of engagement includes research on educational effectiveness for both distance and face-to-face modes of delivery. The findings of educational theory and studies correlating engagement with retention, achievement, and satisfaction will not be

differentiated based on the mode of content delivery whether the educational setting is a face-to-face classroom or a distance education format. The National Survey of Student Engagement (NSSE) database used for this study includes only face-to-face students. Based on Clark's (1983) research and conclusion that media are "mere vehicles that deliver instruction but do not influence student achievement any more than the truck that delivers our groceries causes changes in our nutrition" (1983, p. 445), this study does not differentiate learning theory or learning engagement studies based on their face-to-face or distance education context. This does not mean to imply that all implemented content delivery systems are equally effective in the delivery of that content, but that learning theory is equally applicable to the education process no matter what the delivery vehicle is.

LITERATURE REVIEW

This literature review is presented in three sections. Each section represents a different perspective on the importance, application, and research findings for the role of engagement in successful educational practice. The three sections are the (a) theoretical framework; (b) ingredients for success in education; and (c) engagement themes and their demonstrated educational effectiveness. These sections will frame and put in their proper contexts both the independent and the dependent variables of this study.

Theoretical Framework

This study focused on the primary types of engagement in the educational process mentioned by the research literature and their importance for educational success. These engagement types include student-student, student-content, student-teacher, and student-environment. These

categories correspond to the National Survey of Student Engagement (NSSE) Engagement Indicator themes and High-Impact Practices. Student-content interaction corresponds with the NSSE theme of academic challenge. Student-student interaction corresponds with the NSSE theme of learning with peers. Student-teacher interaction corresponds with the NSSE theme of experiences with faculty. Student-environment interaction corresponds with the NSSE theme of campus environment. The conceptual framework for the importance of engagement in the learning process for this study is based on Wittrock's generative learning theory, Bandura's (1991, 2001) social cognitive theory, Moore's (1989) interaction theory, Anderson's (2003a, 2003b) equivalency theorem, Vygotsky's social development theory, and Tinto's (1982) social integration theory. In addition to this conceptual framework, research studies and scholarly publications on the topic of engagement in the educational process are explored.

Generative Learning Theory. Merlin C. Wittrock's best remembered and enduring contribution to educational psychology and the science of learning is his generative theory of learning (Mayer, 2010; Wittrock, 1974). This theory is significant for the importance of engagement in the learning process because Wittrock described that learning depends not only on what is presented to the learner but also on what the learner already knows and what the learner does with the information (Wittrock, 1974). As students engage with the material presented, they "generate meanings that are consistent with their prior knowledge" (Mayer, 2010, p. 46). Wittrock portrayed learning as an active process between the student and the material as learners engage in active cognitive processes and work to make sense of the new material in relation to their existing frame of reference and understanding. This engagement of the teaching content and the use of cognitive processes are what allow students to assimilate the new material and reorganize their understanding to include the new understanding and merge it with the old to arrive at

a new level of learning and comprehension. Wittrock's work reflected the shift to cognitive constructivism in the 1970s and "reinstating the learner, and his cognitive states and information processing strategies, as a primary determiner of learning" (Mayer, 2010, p. 47; Wittrock, 1974).

To bring the impact of Wittrock's theory up to date, three cognitive processes of active learning seen in today's science of learning have their "roots in Wittrock's generative theory: (a) selecting – which is attending to relevant information in the lesson; (b) organizing – mentally organizing the selected material into a coherent mental representation; (c) integrating – mentally connecting incoming information with relevant prior knowledge activated from long-term memory" (Mayer, 2010, p. 47).

Wittrock's model of generative learning has also been described as having four major processes that put the active and engaged learner in the center of the learning process: (a) attention; (b) motivation; (c) knowledge and preconceptions; and (d) generation (Wittrock, 1992). Each of these processes involve the engagement of the student with the content specifically and the instructional process in general.

Social Cognitive Theory. The work of Albert Bandura also provides a conceptual framework for the importance of engagement in the learning process with his work in the 1960s on social learning theory and then on social cognitive theory in the 80s (Bandura, 1986). Bandura's social learning theory proposes that people learn from one another via observation, imitation, and modeling. It is by observing others' behavior, attitudes, and the outcomes of those behaviors that one learns what appropriate behaviors are, what the consequences of those behaviors might be, and what guidelines to use in planning future behavior. Social cognitive theory, therefore, describes the learning process, and therefore human behavior, as a continuous reciprocal interaction between personal factors such as expectations, beliefs, self-perceptions, goals, and intentions (cognition), behavior, and the environment (Bandura, 1976; Bandura, 1986). There is a constant interaction between the process in a person's mind with the environment, ensuing behavior with the consequences, and how the person interprets the events cognitively. People have the ability to influence their own destiny and are not automatically shaped or controlled by their environment. Within social cognitive theory humans have five unique capabilities (Bandura, 1986): (a) symbolizing – most external influences affect behavior through cognitive processes through the formation of symbols such as images or words which allow humans to make meaning and store information in their memory; (b) vicarious – the human ability to learn not only from direct experience, but also from observation of others; (c) forethought – a person's capability to motivate themselves and guide their actions anticipatorily; (d) self-regulatory – self-regulation mediates external or environmental stimuli and allows people to have control over their own thoughts, feeling, motivations, and actions

(Bandura, 1989; Bandura, 2001); (e) self-reflective – enables people to analyze their experiences, think about their own thought processes and even alter their thinking according to outcomes of their reflection.

A major component of self-reflection is self-efficacy (Bandura, 1977). Self-efficacy, or the belief that a people have mastered or can master a certain skill, develops because of their history of performance in an area and their reflection and evaluation of the performance and whether it was adequate. A person's perceptions about his or her abilities and characteristics will guide behavior by determining what a person tries to achieve and how much effort they will put into his or her performance (Bandura, 1977).

According to social cognitive theory, observational learning is governed by four processes (a) attention; (b) retention; (c) motor reproduction; and (d) motivational (Bandura, 1986). Each of these highlights the importance of the learner's engagement in the process of change. The attention processes include various factors that increase or decrease the amount of attention paid by the subject. Some of these factors are the relevance, accessibility, complexity, or functional value of the behavior being observed as well as the observer's attributes such as cognitive ability, values, and preconceptions. The retention processes involve the mechanics of remembering what was paid attention to, including symbolic coding, mental images, cognitive organization, symbolic rehearsal, and motor rehearsal. A successful retention process allows future access to what was attended for behavioral response. The motor reproduction processes refer to the process of converting symbols that are stored in the memory to appropriate action for modeling to occur.

During reproduction of the behavior a person receives feedback from others as well as self-observation and can adjust their representation for future references. If the resultant behavior

is seen to result in a valued outcome as perceived by the person themselves or feedback from others, there is a greater likelihood that the person will adopt the modeled behavior and continue future reproduction. This adoption is a result of the motivational process. Motivation is having a good reason to imitate or execute behavior and motives can include past experiences, promised incentives, and vicarious incentives from seeing the model reinforced for someone else.

Interaction Theory. Moore (1989) distinguished three types of interaction in the education process (a) learner-content interaction; (b) learner-instructor interaction; (c) learner-learner interaction. The first type of interaction is an interaction between the learner and the content or subject of study and is considered a defining characteristic of education. It is the process of "intellectually interacting with content that results in changes in the learner's understanding, the learner's perspective, or the cognitive structures of the learner's mind" (Moore, 1989, p. 2). The content can be in various forms including text, audio, radio and television broadcasts, electronic recordings, and computer software.

The second form of interaction is an interaction between the learner and the preparer or dispenser of the subject material, or instructor, or learner—instructor interaction. According to Moore (1989), the instructor has several important roles among which are to design, develop, and implement a curriculum or course of study, stimulate and maintain a student's interest in what is being taught, enhance and maintain the learner's interest in the topic, make presentations of information, demonstrations of skill, and model skills, attitudes, and values. Also, instructors are responsible for application and evaluation of what is being learned along with many and various efforts to encourage and support the learner. This type of interaction is "regarded as essential by many educators, and as highly desirable by many learners" (Moore, 1989, p. 2).

The third form of interaction is between the learners, or learner-learner interaction. This type of interaction is described as an "extremely valuable resource for learning and is sometimes even essential" (Moore, 1989, p. 4). Learner-learner interaction is valuable for learning group functioning, leadership, application, and problem solving and receiving input from sources other than the instructor.

Equivalency Theory. Anderson (2003a) states "there is a long history of study and recognition of the critical role of interaction in supporting and even defining education" (p.2). With extensive experience in education using various media, Anderson found that students had preferences for which type of interaction they preferred whether it was student-teacher, student-student, or student content. Some students deliberately choose learning programs that allow them to minimize the amount of student-teacher and student-student interaction required (Anderson, 2003a). Anderson concluded there is a wide range of need and preference for different types of instruction and a strong desire on the part of the students for variety and exposure to different types of educational activity. His observations led to the development of the equivalency theorem which states that if one of the three forms of interaction (student-teacher; student-content; and student-student) is at a high level, the other two may be offered at minimal levels or even eliminated without degrading the educational experience.

A very practical outcome of the theorem is that an instructional designer can substitute one type of interaction for another, for many reasons, and still maintain educational effectiveness.

Social Development Theory. In Vygotsky's social development theory, social interaction is the foundation for development, with consciousness and cognition being the end product of socialization and social behavior (Vygotsky, 1978). Vygotsky states:

> Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (inter-psychological) and then inside the child (intra-psychological). This applies equally to voluntary attention, to logical memory, and to the formation of concepts. All the higher functions originate as actual relationships between individuals (1978, p. 57).

An important part of the socialization process is the presence of the More Knowledgeable Other (MKO) which refers to anyone in social contact with the student who has a better understanding or a higher ability level than the learner. This distance between the learner's ability to perform a task under the guidance of an MKO and/or with peer collaboration and the learner's ability to solve the problem independently is the Zone of Proximal Development (ZPD). In Vygotsky's social development theory, learning occurs in this zone.

Social Integration Theory. Another important conceptual framework for understanding the importance of engagement in the educational process is the work of Vincent Tinto. In his retention theory, Tinto applied Emile Durkheim's theory of suicide to drop outs in higher education. In Durkheim's theory, "suicide is more likely to occur when individuals are insufficiently integrated into the fabric of society. The likelihood of suicide increases with insufficient value integration and collective affiliation" (Tinto, 1975, p. 91). Tinto reasons that as colleges are made up of both social and academic systems, the individual's integration into the academic and social systems of the college directly relates to his continuance in that college. "The higher degree of integration of the individual into the college systems, the greater will be his commitment to the specific institution and to the goal of college completion" (Tinto, 1975, p. 96). Tinto rates peer-group associations as the "social interaction most directly related to individual social integration. Extracurricular activities and faculty interactions appear to be of approximately equal secondary importance in developing a commitment to the institution" (Tinto, 1975, p. 110). A student's values, behavior, and academic plans can be changed and shifted in the direction of the peer group they choose to become part of (Astin, 1993).

Ingredients for Success in Education

Some of the elements cited as necessary for success in education and effective outcomes are student involvement, high expectations, timely assessment, and feedback (Astin, 1985). In a seminal report by Chickering and Gamson (1987), seven principles that can help to improve undergraduate education are identified. These principles are based on research on college-level teaching and learning and are considered good practice in undergraduate education.

1. Good practice in undergraduate education encourages contacts between students and faculty. This type of engagement is perceived as the most important factor in student motivation and involvement. One of the greatest predictors of student satisfaction is the prevalence, quality, and timeliness of student-instructor communication
2. Develops reciprocity and cooperation among students. The report states that learning is enhanced when a collaborative and social team method is utilized rather than a competitive, isolated and individualistic style of learning.
3. Uses active learning techniques and does not treat learning as a passive spectator sport. Students must take an active part in the learning process to engage with the content through exercises and to relate the content to their own lives
4. Gives prompt feedback since this allows the students to know where they stand in the educational process and allows students to make maximum benefit from the courses.
5. Emphasizes time on task. Students need input from the teacher and others in the educational process to help them manage their time well. Allocating appropriate amounts of time to the task will lead to effective learning for the students and effective teaching for the instructors.
6. Communicates high expectations. Expecting more from the students and holding high expectations causes the students to make extra efforts and becomes a self-fulfilling prophecy.
7. Respects diverse talents and ways of learning. Students have different talents and ways of learning that work for them and they need to be engaged by the instructor to maximize their unique abilities and learning approaches.

As can be seen from this list, a key concept in effective learning and success in the educational process is student involvement. Student involvement refers to the "amount of physical and psychological energy that the student devotes to the academic experience" (Astin, 1985, p. 36). Summarizing hundreds of studies of college undergraduates, Astin (1996) shows that the greater the student's degree of involvement, the greater the learning and personal development. The research also shows that the three "most potent forms of involvement turn out to be academic involvement, involvement with faculty, and involvement with student peer groups" (Astin, 1996, p. 36). Hu (2002) considers the most important factor in student learning and personal development during college to be student engagement and the quality of effort students themselves devote to educationally purposeful activities. Kuh (2003) sees student engagement as the key to collegiate quality because "decades of studies show that college students learn more when they direct their efforts to a variety of educationally purposeful activities" (p. 24). Student engagement is related to many positive outcomes including persistence, grades, and satisfaction (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2007). Tinto (2012) supports the importance of engagement by saying that involvement is the most important attribute of effective classrooms. He adds that the more students are academically and socially engaged with academic staff, peers, and classroom activities, the more likely they are to succeed in the classroom.

Engagement Themes and their Educational Effectiveness

In a study seeking to determine the relationships between key student behaviors and the institutional practices and conditions that foster student success, the data from 18 baccalaureate-granting colleges and universities that administered the National Survey of Student Engagement (NSSE) were analyzed (Kuh et al., 2008). In this study student engagement is represented by three separate measures from the NSSE survey: time spent studying, time spent in co-curricular

activities, and a global measure of engagement that includes interaction with faculty, interaction with diverse others, and involvement in opportunities for active and collaborative learning. The study sought to link student engagement to the outcomes of grades and persistence. The findings from this study conclude that student engagement in educationally purposeful activities is positively related to academic outcomes as represented by first-year student grades and by persistence between the first and second year of college. Also, exposure to effective educational practices has a greater effect for lower ability students and students of color compared with white students. In another study consisting of 1058 students at 14 four-year colleges and universities that completed the NSSE survey instrument, the authors found a relatively small positive relationship between engagement and academic performance (Carini, Kuh, & Klein, 2006). Like the previous study, low ability students appear to benefit disproportionately from perceptions of a nurturing environment such as a supportive campus climate and high-quality relationships.

Academic Challenge. A study by Braxton (2001) shows that active learning practices foster student learning. Higher order thinking activities and class discussion encourages social integration and has a positive influence on student persistence. "The use of collaborative or cooperative learning fosters the development of peer groups that play a role both in the learning of course content and the establishment of memberships in the collegiate social communities" (Braxton & McClendon, 2001, p. 62). This supports Tinto's (1997) contention that if social integration is to occur it must begin in the classroom which serves as the gateway for involvement in the academic and social communities of the college. Braxton's study (2000) showed that active learning wielded a statistically significant influence on social integration, subsequent institutional commitment, and students' intent to return. Exploring the role of college faculty in student learning and engagement, Umbach (2005, p. 153) found that students report higher levels of engagement and learning at institutions where faculty use active and collaborative learning techniques, engage students in experiences, emphasize higher order cognitive activities in the classroom, interact with students, challenge students academically, and value enriching education experiences.

Learning with Peers. Cooperative learning has been shown to be more effective than traditional classroom instructional techniques. Working together and engaging in teaching one another works to enrich the educational experience because students are actively involved teaching and mentoring one another (Astin, 1996). Johnson (1981) states that student-student interaction may be more important than student-teacher interaction as a determinant of educational success. Furthermore, cooperative learning experiences appear to be far more effective in promoting desired education outcomes than other types of classroom interaction. In a study examining the relationships between participating in learning communities and student engagement, Kuh (2008) concludes that "using the classroom to create communities of learning must be a high priority in terms of creating a success oriented campus culture" (p. 556). Filkins and Doyle (2002) in their study of first-generation and low-income students using data from the NSSE found that low-income and first-generation students benefit more than non-disadvantaged students from educational practices that involve them in class presentations, discussions, and engaging in collaborative learning activities.

This difference in the effect of collaborative learning was also found in a study by Zhao and Kuh (2004) that examined the relationships between participating in learning communities and student engagement using data from 365 4-year institutions. They found that participating in a learning community is positively linked to engagement as well as student self-reported outcomes and overall satisfaction with college. They also found that students with lower entering SAT/ACT scores were more likely to participate in learning communities than their higher-scoring counterparts, and first-year students in learning communities had lower grades than those without learning community experiences. However, there were no differences in the grades of

seniors between those who did and did not have a learning community experience. Their conclusion because of the study is that experience with a learning community is associated with higher levels of academic effort, academic integration, and active and collaborative learning. Also, they found that learning communities are positively associated with student gains in personal and social development, practical competence, and general education.

In a study by Pike, Kuh, & McCormick (2011) investigating the contingent relationships between learning community participation and student engagement using data from a 2004 administration of the NSSE, results indicated that involvement in a learning community was positively and significantly related to student engagement for both first-year students and seniors.

Experiences with Faculty. Involvement with faculty is one of the three most powerful forms of involvement (Astin, 1996). Student-faculty interaction has the strongest positive correlations with satisfaction with faculty and, according to Astin (1993), has positive effects on all other areas of student satisfaction including the quality of instruction and the overall college experience. Pascarella (1980) concludes that significant positive associations exist between extent and quality of student-faculty informal contact and students' educational aspirations, their attitudes toward college, their academic achievement, intellectual and personal development, and their institutional persistence.

In a longitudinal study conducted at Syracuse University (Pascarella & Terenzini, 1980) seeking to create a predictive model of freshman persistence and voluntary dropout from a theoretical model based on the concepts of Tinto's model of academic and social integration, researchers were able to support the predictive validity of the major dimensions of the Tinto model. Student-faculty relationships, as measured by interactions with faculty and the faculty concern for student development, made particularly strong contributions to the predictive validity

of retention. Persisters scores on the student-faculty scales were approximately one standard deviation higher than those students who dropped out voluntarily at the end of their freshman year.

Campus Environment. Due to the importance of engagement with campus environment, non-involvement with the academic environment can have a negative effect. Non-involvement can be correlated with living at home, commuting, attending part-time, being employed off campus, being employed full-time, and watching television (Astin, 1996). It seems important for the student to choose their peer group with care since the peer group is the strongest single element in the student's educational experience and has the capacity to affect the intensity of the student engagement with the educational process (Astin, 1996).

Not only is it important for students to choose their peers wisely, but it also appears important that they become socially involved early in the academic year (Berger & Milem, 1999). Berger (1999) goes on the say that early peer involvement strengthens the student's perceptions of institutional and social support and ultimately affects persistence. His conclusion is that academic and social integration are important predictors of subsequent institutional commitment. A study by Braxton (2001) supports these findings by showing that social integration positively influences subsequent institutional commitment, and subsequent institutional commitment positively affects persistence in college. Also, living on campus and a sense of community in residence halls facilitates the social integration of first-year students.

In a study examining the relationship between types of student engagement and fall-to-fall retention of first-year students at a Southeastern public university (Shinde, 2010), the significant predictors of freshman retention were Social Engagement and Overall Satisfaction at the

university. If the students were socially engaged, they were more likely to retain which supports Tinto's model that correlates social and academic integration with persistence (p. 59).

NSSE High-Impact Practices. In addition to the 10 engagement indicators, the NSSE, in a separate report, provides results on six High-Impact Practices which are so named because of their positive associations with student learning and retention. According to the National Survey of Student Engagement, High-Impact Practices (HIPs) represent enriching educational experiences that can be life-changing. They are activities that demand considerable time and effort, facilitate learning outside of the classroom, require meaningful interactions with faculty and other students, encourage collaboration with diverse others, and provide frequent and substantive feedback (http://nsse.indiana.edu/). The High-Impact Practices measured for first-year students are participation in learning communities, service-learning, and research with faculty.

Purpose of Study

The purpose of this study was to determine if the National Survey of Student Engagement indicators (NSSE), NSSE High-Impact Practices, NSSE demographic variables and non-involvement factors can significantly predict student achievement, satisfaction, and retention. This study sought to benefit the instructional design process and to assist instructional designers and educators designing instruction that could lead to increased achievement, retention, and student satisfaction. This study informs instructional design practices by providing additional insight regarding the relationship of the four types of interaction with instructional success as measured by retention, final grades, and student satisfaction. Furthermore, this study could also help determine which, if any, of the four types of interaction in the education setting, gives the best return on

time and energy investment as measured by retention, grades, and satisfaction. Additional guidance may also be provided to educators and instructional designers working in both the face-to-face classroom as well as distance education setting on the creation and use of student to student, student to teacher, student to content, and student to environment engagement strategies in the instructional design process as well as the design of educational systems. The four types of interaction, student to student, student to content, student to instructor, and student to environment, are reflected in the ten National Survey of Student Engagement (NSSE) Engagement Indicators and the six NSSE high-impact practice items.

Research Questions

This study answers the following six research questions:

1. After controlling for significant demographic variables, how does the NSSE theme of academic challenge significantly predict achievement, retention, and student satisfaction?
2. After controlling for significant demographic variables, how does the NSSE theme of learning with peers, significantly predict achievement, retention, and student satisfaction?
3. After controlling for significant demographic variables, how does the NSSE theme of experiences with faculty significantly predict achievement, retention, and student satisfaction?
4. After controlling for significant demographic variables, how does the NSSE theme of campus environment significantly predict achievement, retention, and student satisfaction?
5. After controlling for significant demographic variables, how does the NSSE high-impact practices overall score significantly predict achievement, retention, and student satisfaction.

6. After controlling for significant demographic variables, what combination of scores, including the NSSE high-impact practices overall score and the ten NSSE Engagement Indicators, best predicts retention, and student satisfaction?

CHAPTER II

METHOD

Research Design

IRB approval was obtained for purposes of this study prior to data analysis. This study used NSSE data from a large public university in the Southeast of the United States. Engagement data resulting from the university's participation in the National Survey of Student Engagement NSSE for 2015 and 2016 was statistically analyzed to determine if engagement indicators, high-impact practices, demographic variables, and non-involvement factors significantly predict achievement, retention, and student satisfaction.

Participants

Study participants were students who had responded on the NSSE that they are non-transfer freshmen at a university in the South Eastern United States and had voluntarily participated in the NSSE survey in 2015 and 2016. Freshman transfers were not included in the study.

Instruments

Data for this study was provided by the University because of their participation with National Survey of Student Engagement (NSSE), which annually collects information at hundreds of four-year colleges and universities about first-year and senior student's participation in programs and activities that institutions provide for their learning and personal development. Created under the auspices of the Pew Charitable Trust beginning in 1998 (Kuh, 2001b), The National Survey of Student Engagement (NSSE) reports on four themes which are further divided into 10 Engagement Indicators (EI), shown in Table 1, which are calculated from 47 core NSSE Component items. The indicators are grouped into four themes: academic challenge, learning

with peers, experiences with faculty, and campus environment. These four themes correspond to the four types of interaction highlighted by Moore (1989) and Tinto (1975) and the conceptual framework of this study which are student-to-student, student-to-content, student-to-instructor, and student-to-environment. In the Engagement Indicators report, each EI is expressed on a 60-point scale. Component items are converted to a 60-point scale (Never=0, Sometimes=20, Often=40, and very often=60) then averaged together to compute student-level scores.

Table 1

NSSE Engagement Indicators

Theme	Engagement Indicators
Academic Challenge	1. Higher-order learning During the current school year, how much has your coursework emphasized the following: • Applying facts, theories, or methods to practical problems or new situations • Analyzing an idea, experience, or line of reasoning in depth by examining its parts • Evaluating a point of view, decision, or information source • Forming a new idea or understanding from various pieces of information 2. Reflective & integrative learning During the current school year, how often have you: • Combined ideas from different courses when completing assignments • Connected your learning to societal problems or issues • Included diverse perspectives (political, religious, racial/ethnic, gender, etc.) in course discussions or assignments • Examined the strengths and weaknesses of your own views on a topic or issue • Tried to better understand someone else's views by imagining how an issue looks from his or her perspective • Learned something that hanged the way you understand an issue or concept

	• Connected ideas from your courses to your prior experiences and knowledge 3. Learning strategies During the current school year, how often have you • Identified key information from reading assignments • Reviewed your notes after class • Summarized what you learned in class or from course materials 4. Quantitative reasoning During the current school year, how often have you: • Reached conclusions based on your own analysis of numerical information (numbers, graphs, statistics, etc.) • Used numerical information to examine a real-world problem or issue (unemployment, climate change, public health, etc.) • Evaluated what others have concluded from numerical information
Learning with Peers	5. Collaborative learning During the current school year, how often have you: • Asked another student to help you understand course material • Explained course material to one or more students • Prepared for exams by discussing or working through course material with other students • Worked with other students on course projects or assignments 6. Discussions with diverse others During the current school year, how often have you had discussions with people from the following groups: • People from a race or ethnicity other than your own • People from an economic background other than your own • People with religious beliefs other than your own • People with political views other than your own
Experiences with Faculty	7. Student-faculty interaction During the current school year, how often have you: • Talked about career plans with a faculty member • Worked with a faculty member on activities other than coursework (committees, student groups, etc.) • Discussed course topics, ideas, or concepts with a faculty member outside of class

	• Discussed your academic performance with a faculty member 8. Effective teaching practices During the current school year, to what extent have your instructors done the following: • Clearly explained course goals and requirements • Taught course sessions in an organized way • Used examples or illustrations to explain difficult points • Provided feedback on a draft or work in progress • Provided prompt and detailed feedback on tests or completed assignments
Campus Environment	9. Quality of interactions Indicate the quality of your interactions with the following people at your institution: • Students • Academic advisors • Faculty • Student services staff (career services, student activities, housing, etc.) • Other administrative staff and offices (registrar, financial aid, etc.) 10. Supportive environment How much does your institution emphasize the following? • Providing support to help students succeed academically • Using learning support services (tutoring services, writing center, etc.) • Encouraging contact among students from different backgrounds (social, racial/ethnic, religious, etc.) • Providing opportunities to be involved socially • Providing support for your overall well-being (recreation, health care, counseling, etc.) • Helping you manage your nonacademic responsibilities (work, family, etc.) • Attending campus activities and events (performing arts, athletic events, etc.) • Attending events that address important social, economic, or political issues

In addition to the engagement indicators the NSSE also reports on High-Impact Practices (HIP) that have positive associations with student learning and retention. According to the NSSE website, certain undergraduate opportunities, due to their positive associations with student learning and retention, are designated "high-impact" practices (http://nsse.indiana.edu/html/high_impact_practices.cfm) (Kuh, 2008). The NSSE asks students about their participation in the following six practices which also fall within one of four types of engagement:

1. Learning community or some other formal program where groups of students take two or more classes together (First-year students and seniors)
2. Courses that included a community-based project (service learning) (First-year students and seniors)
3. Work with a faculty member on a research project (First-year students and seniors)
4. Internship, co-op, field experience, student teaching, or clinical placement (Seniors only)
5. Study abroad (Seniors only)
6. Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, portfolio) (Seniors only)

The NSSE reports participation in learning communities, service-learning, and research with faculty for both first-year students and seniors, and reports participation in internships or field experiences, study abroad, and culminating senior experiences only for seniors. Since this study only includes results from first-year freshman students, high impact practices one, two, and three are used from the above list. Participation is reported as the percentage of students who responded, "Done or in progress" for all HIPs except service-learning.

Student engagement, as measured by the NSSE, represents two features of educational quality:

1. The amount of time and effort students put into their studies and other educationally purposeful activities,
2. How the institution deploys its resources and organizes the curriculum and other learning opportunities to get students to participate in activities that decades of research studies show are linked to student learning (http://nsse.indiana.edu/html/about.cfm).

For the purposes of this study achievement was defined and measured for freshman participants by the NSSE eight-point scale question "What have most of your grades been up to now at this institution"? Retention was measured for freshmen only by whether a student dropped out of the program during or after their freshman year and did not register for the succeeding semester. Satisfaction was measured by continued enrollment as well as answers on a four-point scale ranging from excellent to poor and definitely yes to definitely no to the following two NSSE survey questions:

1. How would you evaluate your entire educational experience at this institution? Excellent, Good, Fair, Poor
2. If you could start over again, would you go to the same institution you are now attending? Definitely yes, Probably yes, Probably no, Definitely no

The NSSE also measures demographic information as well as participation in activities that this study has determined to be non-engagement, or non-involvement factors. The demographic variables used in this study as reported in the NSSE included gender and racial or ethnic identification. Variables measured by the NSSE that have been determined by research (Kuh, 2003; Kuh, 2008) to influence engagement (non-involvement factors) that were used in this

study included working for pay off campus, working for pay on campus, time spent relaxing and socializing (time with friends, video games, TV or video, keeping up with friends online, etc.), and providing care for dependents (children, parents, etc.).

Data Analysis

The following table 2 summarizes the data analysis for this study which is described in greater detail in the following sections.

Table 2

Data Analysis Elements

Research Question	Variables	Source	Analysis
1. After controlling for significant demographic and non-involvement factors, does the NSSE theme of academic challenge, which includes the Engagement Indicators (a) higher-order learning, (b) reflective & integrative learning, (c) learning strategies, and (d) quantitative reasoning, significantly predict achievement, retention, and student satisfaction?	Independent Variable: academic challenge Score. Dependent Variables: achievement, retention, student satisfaction	NSSE Data	SK/SE; Hierarchical stepwise regression analysis; For any outcome measures that have been dichotomized, the regression analysis takes the form of a hierarchical logistic regression analysis.

2. After controlling for significant demographic and non-involvement factors, does the NSSE theme of learning with peers, which includes the Engagement Indicators (a) collaborative learning, and (b) discussions with diverse others, significantly predict achievement, retention, and student satisfaction?	Independent Variable: Learning with Peers Score. Dependent Variables: achievement, retention, Student satisfaction	NSSE Data	SK/SE; Hierarchical stepwise regression analysis; For any outcome measures that have been dichotomized, the regression analysis takes the form of a hierarchical logistic regression analysis.
3. After controlling for significant demographic and non-involvement factors, does the NSSE theme of experiences with faculty, which includes the Engagement Indicators (a) student-faculty interaction, and (b) effective teaching practices, significantly predict achievement, retention, and student satisfaction?	Independent Variable: Experiences with Faculty Score. Dependent Variables: achievement, retention, Student satisfaction	NSSE Data	SK/SE; Hierarchical stepwise regression analysis; For any outcome measures that have been dichotomized, the regression analysis takes the form of a hierarchical logistic regression analysis.
4. After controlling for significant demographic and non-involvement factors, does the NSSE theme of campus environment, which includes the Engagement Indicators (a)	Independent Variable: Campus Environment Score. Dependent Variables: achievement, retention, Student satisfaction	NSSE Data	SK/SE; Hierarchical stepwise regression analysis; For any outcome measures that have been dichotomized, the regression analysis takes the form of a hierarchical logistic regression analysis.

quality of interactions, and (b) supportive environment, significantly predict achievement, retention, and student satisfactions?			
5. After controlling for significant demographic and non-involvement factors, does the NSSE high-impact practices (for freshmen) overall score significantly predict achievement, retention, and student satisfaction?	Independent Variable: High-Impact Practice Score. Dependent Variables: Achievement, retention, Student satisfaction	NSSE Data	SK/SE; Hierarchical stepwise regression analysis; For any outcome measures that have been dichotomized, the regression analysis takes the form of a hierarchical logistic regression analysis.
6. After controlling for significant demographic and non-involvement factors, what combination of scores, including the three NSSE high-impact practices overall score and the ten NSSE engagement indicators, best predicts achievement, retention, and student satisfaction?	Independent Variable: High-Impact Practice Score and NSSE Engagement Indicators. Dependent Variables: Achievement, retention, Student satisfaction	NSSE Data	Hierarchical stepwise regression analysis; For any outcome measures that have been dichotomized, the regression analysis takes the form of a hierarchical logistic regression analysis.

Study Measures

The dependent or outcome variables were student retention for freshmen only (retained after Freshman year versus not retained), achievement, as measured by the eight-point NSSE

grade point scale at the end of the Freshman year, and satisfaction as measured by two NSSE satisfaction questions. Two new variables were created for the two NSSE satisfaction questions. The first variable was coded 1 = excellent or good and 0 = fair or poor for the first satisfaction question. The second variable was coded 1 = definitely yes or probably yes and 0 = probably no or definitely no for the second satisfaction question. The independent or predictor variables were the ten NSSE Engagement Indicators, which were averages formed from 47 items scored on a 4-point scale from 0 to 60, and an overall high impact practices score, formed as a sum of three practices for freshman students, which they reported as having done or as in the process of doing. Demographic and non-involvement variables taken from the NSSE and used in the analysis included gender, racial or ethnic identification, working for pay off campus, working for pay on campus, time spent relaxing and socializing (time with friends, video games, TV or video, keeping up with friends online, etc.), providing care for dependents (children, parents, etc.).

Research indicates that jobs detract from students studying when the hours per week exceeds 20 (Astin, 1975). Students who worked 15-20 hours a week often report higher GPAs than those who do not work at all (Astin, 1975; Dundes & Marx, 2006). The National Center for Education Statistics (NCES), found that students working 1-15 hours weekly have a significantly higher GPA than students working 16 or more hours and students who do not work at all (Statistics, 1994). However, most the students in this study did not work on or off campus, nor did they care for dependents, making the distributions of these three variables essentially bimodal. Therefore, these non-involvement factors were dichotomized (anytime vs. no time) for the purposes of testing the research questions. Grade point average and the NSSE variables, including the two satisfaction questions, the ten Engagement Indicators, and the overall three High

Impact Practice scores were assessed for normality using skewness values divided by the standard errors of skewness (SK/SE). An SK/SE score between -2 and +2 is indicative of a normal distribution. An appropriate normalizing transformation, such as the square root or logarithm, was applied to any measure that is found not normally distributed prior to testing of the research questions. Variables that proved to be bimodal were collapsed into a dichotomy.

Research Question Testing

Research questions 1 through 4 were tested using four hierarchical stepwise regression analyses, one for each of the four outcome measures (achievement, retention, and the two student satisfaction items). In the first block, the demographic and non-involvement factors were allowed to enter the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. After significant demographic and non-involvement factors were entered into the equation, the Engagement Indicators relevant to each research question were entered. The standardized regression coefficients (beta weights) were used to determine the relative and combined impact of the demographics and Engagement Indicators on the outcome measures.

Research questions 5 and 6 were tested using hierarchical stepwise regression. For any outcome measures that were dichotomized, the regression analysis took the form of a hierarchical logistic regression analysis.

CHAPTER III

RESULTS

Participants

An original sample of 552 freshman students included 300 students from the 2015 school year and 252 students from the 2016 school year. Thirty-nine transfer students were identified and excluded from the sample. An additional 20 students with no Engagement Indicator data were also excluded. The final sample included 493 freshman students. Several of the research questions were tested using a considerably smaller sample due to missing data. Gender and ethnicity are detailed in Table 3.

Table 3

Demographic characteristics of the sample

		Frequency	Percent
Gender			
	Female	331	67.1
	Male	162	32.9
Race or ethnicity			
	American Indian or Alaska Native	1	.2
	Asian	26	5.3
	Black or African American	144	29.2
	Hispanic or Latino	29	5.9
	Native Hawaiian or Other Pacific Islander	3	.6
	White	226	45.8
	Two or more races/ethnicities	50	10.1
	Unknown	14	2.8

The four non-involvement factors identified in the study are shown in Table 4. Most the students did not work on or off campus, nor did they care for dependents, making the distributions of these three variables essentially bimodal. Therefore, these non-involvement factors were dichotomized (any time vs. no time) for the purposes of testing the research questions.

Table 4

Non-involvement Factors

		Frequency	Percent
Working for pay off campus			
	0 Hours per week	262	69.7
	1-5	25	6.6
	6-10	16	4.3
	11-15	18	4.8
	16-20	24	6.4
	21-25	14	3.7
	26-30	5	1.3
	More than 30	12	3.2
	Total	376	100.0
Working for pay on campus			
	0 Hours per week	300	80.0
	1-5	11	2.9
	6-10	21	5.6
	11-15	21	5.6
	16-20	12	3.2
	21-25	4	1.1
	26-30	3	.8
	More than 30	3	.8
	Total	375	100.0
Relaxing and socializing (time with friends, video games, TV or videos, keeping up with friends online, etc.)			
	0 Hours per week	7	1.8
	1-5	80	21.1
	6-10	102	26.9
	11-15	70	18.5
	16-20	56	14.8
	21-25	29	7.7
	26-30	9	2.4
	More than 30	26	6.9
	Total	379	100.0

Providing care for dependents (children, parents, etc.)			
	0 Hours per week	290	77.5
	1-5	41	11.0
	6-10	16	4.3
	11-15	8	2.1
	16-20	9	2.4
	21-25	4	1.1
	26-30	2	.5
	More than 30	4	1.1
	Total	374	100.0

Preliminary Analyses

Prior to testing the research questions, the distributions of the continuous dependent and independent measures were assessed for normality and potential covariates were tested for significant relationships with the dependent variables. The dependent variables included measures of achievement (self-reported grade-point average), retention (enrollment in the next Fall semester) and satisfaction (evaluation of the academic experience and whether the student would choose the same institution if starting over again). These measures are detailed in Table 5.

Table 5

Dependent Variables

		Frequency	Percent
What have most of your grades been up to now at this institution?			
	C- or lower	8	2.1
	C	11	2.9
	C+	14	3.7
	B-	28	7.5
	B	69	18.4
	B+	67	17.9
	A-	52	13.9
	A	125	33.4
	Total	374	100.0
Enrolled for next Fall semester			
	No	51	10.3
	Yes	442	89.7

Total	493	100
How would you evaluate your entire educational experience at this institution?		
Poor	8	2.1
Fair	50	13.4
Good	213	57.0
Excellent	103	27.5
Total	374	100.0
If you could start over again, would you go to the same institution you are now attending?		
Definitely no	13	3.4
Probably no	60	15.9
Probably yes	192	50.9
Definitely yes	112	29.7
Total	377	100.0

The two measures of satisfaction were dichotomized. Evaluation of the academic experience was coded 1 = excellent or good and 0 = fair or poor and whether the student would choose the same institution if starting over again was coded 1 = definitely yes or probably yes and 0 = probably no or definitely no. Grade point average was treated as a continuous variable.

The independent variables included the ten NSSE engagement indicators and an overall high impact practices score, formed as a sum of three practices for freshman students, which they report having done or in the process of doing. The three high impact practices are shown in Table 6.

Table 6

High Impact Practices

	Frequency	Percent
Participate in a learning community or some other formal program where groups of students take two or more classes together		
Have not decided	132	31.8
Do not plan to do	119	28.7
Plan to do	107	25.8
Done or in progress	57	13.7
Total	415	100.0
About how many of your courses at this institution have included a community-based project		

	None	248	59.9
	Some	137	33.1
	Most	24	5.8
	All	5	1.2
	Total	414	100.0
Work with a faculty member on a research project			
	Have not decided	157	38.3
	Do not plan to do	87	21.2
	Plan to do	150	36.6
	Done or in progress	16	3.9
	Total	410	100.0
Number of high impact practices			
	0	214	53.0
	1	147	36.4
	2	39	9.7
	3	4	1.0
	Total	404	100.0

Since more than half of the students did not report any high impact practices, this variable was dichotomized (none vs. any).

Summary statistics for the ten NSSE engagement indicators as well as for grade point average and time relaxing and socializing are shown in Table 7. Since the sample size for all continuous measures was large (over 300), the normality of the distributions could be assessed directly with skewness and kurtosis values. According to Kim (2013), for sample sizes greater than 300, one should "depend on the histograms and the absolute values of skewness and kurtosis without considering z-values. Either an absolute skew value larger than 2 or an absolute kurtosis (proper) larger than 7 may be used as reference values for determining substantial non-normality"(p. 53).

Table 7

NSSE Engagement Indicators, Grade Point Average and Time Relaxing and Socializing

	N	Mean	SD	Skewness	Kurtosis

Higher-Order Learning	448	39.61	13.50	-0.12	-0.74
Reflective & Integrative Learning	469	35.85	12.27	0.05	-0.45
Learning Strategies	414	40.03	14.42	-0.26	-0.66
Quantitative Reasoning	453	27.20	16.09	0.25	-0.59
Collaborative Learning	485	30.58	13.10	0.35	-0.29
Discussions with Diverse Others	419	42.34	15.67	-0.52	-0.58
Student-Faculty Interaction	453	21.57	13.73	0.69	0.17
Effective Teaching Practices	456	38.84	12.73	-0.17	-0.43
Quality of Interactions	395	39.74	12.29	-0.43	-0.17
Supportive Environment	380	38.43	13.75	-0.25	-0.44
Grade point average	374	6.14	1.81	-0.82	0.09
Time relaxing and socializing	379	3.90	1.74	0.81	0.00

To determine the significance of the potential covariates, a series of chi-square analyses, t-tests and correlations were conducted. Using chi-square analyses, gender, ethnicity (Asian vs. other; Black vs. other; Latino vs. other; and White vs. other), time working off campus (none vs. any), time working on campus (none vs. any) and time caring for dependents (none vs. any) were compared to enrollment in the next Fall semester (yes vs. no), evaluation of the academic experience (excellent or good vs. fair or poor) and whether the student would choose the same institution if starting over again (definitely yes or probably yes vs. probably no or definitely no). T-tests were conducted to assess significant relationships with grade point average by gender, ethnicity (Asian vs. other; Black vs. other; Latino vs. other; and White vs. other), time working off campus (none vs. any), time working on campus (none vs. any) and time caring for dependents (none vs. any). T-tests were also used to compare time spent relaxing and socializing by enrollment in the next Fall semester (yes vs. no), evaluation of the academic experience (excellent or good vs. fair or poor) and whether the student would choose the same institution if starting over again (definitely yes or probably yes vs. probably no or definitely no). Finally, a Pearson

correlation was used to compare grade point average with time relaxing and socializing. Significant relationships were found between grade point average and ethnicity and any time working on campus. Asian students reported significantly higher grade point averages (7.38 +/- .92 versus 6.06 +/- 1.83 for other ethnicities; t (372) = -3.28, p = .001) and African American students reported significantly lower grade point averages (5.40 +/- 1.67 versus 6.41 +/- 1.80 for other ethnicities; t (372) = 4.88, p < .001). Those who reported any time working on campus for pay also reported lower grade point averages (5.66 +/- 1.78 versus 6.28 +/- 1.78 than those with no paid on-campus jobs; t (367) = 2.67, p = .008). Students who reported any time working off campus were less positive in their evaluation of their academic experience: 78.6% rated their experience good or excellent compared to 86.8% of those who reported no time working off campus; $\chi 2$ (1) 3.96, p = .047. Those who reported any time working off campus were also less apt to say they would choose the same institution: 73.7% said they probably or definitely would, compared to 83.3% of those who reported no time working off campus; $\chi 2$ (1) 4.67, p = .031. Females were more apt to say they would choose the same institution: 83.8% said they probably or definitely would, compared to 74.6% males; $\chi 2$ (1) 4.60, p = .032. Finally, those who reported any time caring for dependents were less apt to say they would choose the same institution: 72.3% said they probably or definitely would compared to 82.6% of those who reported no time caring for dependents; $\chi 2$ (1) 4.30, p = .038. The significant covariates were included in hierarchical regressions used to test the research questions.

Academic Challenge as a Predictor of Achievement, Retention, and Student Satisfaction

The role of academic challenge was examined to determine if it could significantly predict achievement, retention, and student satisfaction. Academic challenge was comprised of the following engagement indicators: (a) higher-order learning, (b) reflective & integrative learning,

(c) learning strategies, and (d) quantitative reasoning. This question was tested using four regression analyses.

For the dependent variable of achievement, a hierarchical regression on grade point average was conducted. The first block consisted of covariates that were found significant in preliminary analyses, namely, Asian ethnicity, Black ethnicity and any time working on campus. These were considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Once all independently significant covariates were entered, the second block in the regression was initiated, and the four academic challenge engagement indicators were considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Results of this analysis are presented in Table 8.

Table 8

Hierarchical Regression on Achievement (grade point average) Using Academic Challenge Engagement Indicators as Potential Predictors

Step	*Variables Entered*	R^2	R^2 *Change*	*F Change*	*df*	*p*	*β*	*t*	*p*
1	Black ethnicity	.066	.066	24.49	1, 348	< .001	-.229	-4.53	< .001
2	Asian ethnicity	.080	.015	5.48	1, 347	.020	.119	2.36	.019
3	Higher-Order Learning	.109	.028	11.06	1, 346	.001	.180	3.04	.003
4	Quantitative Reasoning	.131	.022	8.73	1, 345	.003	-.188	-3.36	.001
5	Learning Strategies	.146	.015	6.16	1, 344	.014	.142	2.48	.014

Once Asian ethnicity and Black ethnicity were entered into the equation, any time working on campus did not add significantly to the prediction and so was not entered. Three of the four academic challenge indicators could significantly enhance the prediction of achievement above and beyond the ethnicity covariates. All five predictors explained 14.6% of the variance in achieve-

ment. As shown by the beta weights, Asian ethnicity, higher-order learning and learning strategies were positively predictive, while Black ethnicity and quantitative reasoning were negatively predictive of achievement. It should be noted that, by itself, quantitative reasoning was not significantly related to achievement (Pearson r = -.082, p = .114), but after adjusting for the ethnicity variables and Higher Order Learning, it became significantly predictive.

For the dependent variable of retention, a stepwise logistic regression on enrollment in the next Fall semester was conducted. Stepwise selection was based on the significance of the score statistic, which is used to predict whether or not an independent variable would be significant in the model. No covariates were considered for entry into the regression equation, since none were found significantly related to retention in preliminary analyses. Results are presented in Table 9.

Table 9

Stepwise Logistic Regression on Retention Using Academic Challenge Engagement Indicators as Potential Predictors (n = 399)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*Df*	*p*	*Odds Ratio*
	Higher-Order Learning	0.12	1	.725				
	Reflective & Integrative Learning	0.65	1	.421				
	Learning Strategies	0.34	1	.561				
	Quantitative Reasoning	0.74	1	.391				

As shown, none of the academic challenge indicators were found to be significantly related to retention.

For the dependent variable of satisfaction, two hierarchical logistic regressions were conducted. The first was used to predict positive (excellent or good vs. fair or poor) academic experience using academic challenge engagement indicators as potential predictors. Results are presented in Table 10.

Table 10

Hierarchical Logistic Regression on Satisfaction (Positive Experience) Using Academic Challenge Engagement Indicators as Potential Predictors (n = 349)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
1	Any time working off campus				3.92	1	.048	0.53
2	Higher-Order Learning				12.05	1	.001	1.05
3	Learning Strategies				6.64	1	.010	1.03
4	Reflective & Integrative Learning				5.06	1	.024	0.97
	Quantitative Reasoning	0.11	1	.744				

As indicated by the odds ratios below 1, anytime working off campus and Reflective and Integrative Learning were found negatively predictive of a positive evaluation, whereas higher-order learning and learning strategies were positively predictive, with odds ratios above 1.0.

The second hierarchical logistic regression was used to predict whether the student would choose the same institution if starting over again (definitely yes or probably yes vs. probably no or definitely no) using academic challenge engagement indicators as potential predictors. Results are presented in Table 11.

Table 11

Hierarchical Logistic Regression on Satisfaction (Would Attend Same Institution) Using Academic Challenge Engagement Indicators as Potential Predictors (n = 349)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
1	Gender				4.20	1	.040	0.57
2	Any time working off campus				4.35	1	.037	0.55
	Any time caring for dependents	2.17	1	.141				
3	Higher-Order Learning				7.55	1	.006	1.03
	Reflective & Integrative Learning	0.27	1	.606				
	Learning Strategies	0.02	1	.900				
	Quantitative Reasoning	0.02	1	.898				

After adjusting for gender and time working off campus, higher-order learning was found to be significantly predictive of satisfaction, as measured by an inclination to choose the same institution if starting over again. The other three academic challenge indicators were not found to add significantly to the prediction.

Learning with Peers as a Predictor of Achievement, Retention, and Student Satisfaction

The role of learning with peers, which includes the Engagement Indicators (a) collaborative learning, and (b) discussions with diverse others, was examined to determine if it could significantly predict achievement, retention, and student satisfaction. This question was tested using four regression analyses.

For the dependent variable of achievement, a hierarchical regression on grade point average was conducted. The first block consisted of covariates that were found significant in preliminary analyses, namely, Asian ethnicity, Black ethnicity and any time working on campus. These

were considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Once all independently significant covariates were entered, the second block in the regression was initiated, and the two learning with peers engagement indicators were considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Results of this analysis are presented in Table 12.

Table 12

Hierarchical Regression on Achievement (Grade Point Average) Using Learning With Peers Engagement Indicators as Potential Predictors

Step	*Variables Entered*	R^2	R^2 *Change*	*F Change*	*df*	*p*	*β*	*t*	*p*
1	Black	.053	.053	20.18	1,358	.000	-.197	-3.79	< .001
2	Asian	.071	.018	6.87	1,357	.009	.137	2.67	.008
3	Any time working on campus	.082	.011	4.11	1,356	.043	-.104	-2.03	.043

After adjusting for significant covariates, neither of the learning with peers engagement indicators were found to add significantly to the prediction.

For the dependent variable of retention, a stepwise logistic regression on enrollment in the next Fall semester was conducted. Stepwise selection was based on the significance of the score statistic. No covariates were considered for entry into the regression equation, since none were found significantly related to retention in preliminary analyses. Results are presented in Table 13. As shown, neither of the learning with peers engagement indicators were found significantly predictive of retention.

Table 13

Stepwise Logistic Regression on Retention Using Learning with Peers Engagement Indicators as Potential Predictors (n = 413)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
	Collaborative Learning	0.09	1	.769				
	Discussions with Diverse Others	0.37	1	.542				

For the dependent variable of satisfaction, two hierarchical logistic regressions were conducted. The first was used to predict positive (excellent or good vs. fair or poor) academic experience using learning with peers engagement indicators as potential predictors. Results are presented in Table 14. As shown, neither time working off campus nor either of the learning with peers engagement indicators was found significantly predictive of satisfaction, as measured by positive evaluation of the academic experience.

Table 14

Hierarchical logistic regression on Satisfaction (Positive Experience) Using Learning with Peers Engagement Indicators as Potential Predictors (n = 360)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
	Any time working off campus	2.28	1	.131				
	Collaborative Learning	3.40	1	.065				
	Discussions with Diverse Others	3.09	1	.079				

The second hierarchical logistic regression was used to predict whether the student would choose the same institution if starting over again (definitely yes or probably yes vs. probably no or definitely no) using learning with peers engagement indicators as potential predictors. Results are presented in Table 15. As shown, gender and the discussions with diverse others engagement

indicator were entered into the regression equation. The odds ratio for gender is below 1.0, indicating that males were less likely to say they would attend the same institution. Students with higher values for the discussions with diverse others engagement indicator were more likely to say they would attend the same institution, as indicated by the odds ratio above 1.0.

Table 15

Hierarchical Logistic Regression on Satisfaction (Would Attend Same Institution) Using Learning with Peers Engagement Indicators as Potential Predictors (n = 358)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
1	Gender				4.87	1	.027	0.55
	Any time working off campus	3.61	1	.057				
	Any time caring for dependents	3.15	1	.076				
	Collaborative Learning	2.70	1	.100				
2	Discussions with Diverse Others				6.53	1	.011	1.02

Experiences with Faculty as a Predictor of Achievement, Retention, and Student Satisfaction

The NSSE theme of experiences with faculty, which includes the Engagement Indicators (a) student-faculty interaction, and (b) effective teaching practices, was examined to determine if it could significantly predict achievement, retention, and student satisfaction. This question was tested using four regression analyses.

For the dependent variable of achievement, a hierarchical regression on grade point average was conducted. The first block consisted of covariates that were found significant in preliminary analyses, namely, Asian ethnicity, Black ethnicity and any time working on campus. These were considered for entry into the regression equation in a stepwise fashion using an alpha of .05

as the criterion for entry. Once all independently significant covariates were entered, the second block in the regression was initiated, and the two experiences with faculty engagement indicators were considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Results of this analysis are presented in Table 16.

Table 16

Hierarchical Regression on Achievement (Grade Point Average) Using Experiences with Faculty Engagement Indicators as Potential Predictors

Step	*Variables Entered*	R^2	R^2 *Change*	*F Change*	*df*	*p*	*β*	*t*	*p*
1	Black	.062	.062	23.40	1,357	.000	-.239	-4.77	< .001
2	Asian	.080	.018	7.03	1,356	.008	.128	2.56	.011
3	Any time working on Campus	.135	.055	22.52	1,355	.000	.235	4.75	< .001

After adjusting for significant covariates, neither of the experiences with faculty engagement indicators were found to add significantly to the prediction.

For the dependent variable of retention, a stepwise logistic regression on enrollment in the next Fall semester was conducted. Stepwise selection was based on the significance of the score statistic. No covariates were considered for entry into the regression equation since none were found significantly related to retention in preliminary analyses. Results are presented in Table 17. As shown, the effective teaching practices engagement indicator was found significantly predictive of retention. The student-faculty interaction engagement indicator was not found to add significantly to the prediction.

Table 17

Stepwise Logistic Regression on Retention Using Experiences with Faculty Engagement Indicators as Potential Predictors (n = 445)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
	Student-Faculty Interaction	0.27	1	.600				
1	Effective Teaching Practices				5.13	1	.023	1.03

For the dependent variable of satisfaction, two hierarchical logistic regressions were conducted. The first was used to predict positive (excellent or good vs. fair or poor) academic experience using experiences with faculty engagement indicators as potential predictors. Results are presented in Table 18. After adjusting for the significant covariate, anytime working off campus, both experiences with faculty engagement indicators added to the prediction of satisfaction, as measured by positive evaluation of the academic experience.

Table 18

Hierarchical Logistic Regression on Satisfaction (Positive Experience) Using Experiences with Faculty Engagement Indicators as Potential Predictors (n = 359)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
	Any time working off campus	3.63	1	.057				
1	Effective Teaching Practices				14.55	1	.000	1.05
2	Student-Faculty Interaction				5.94	1	.015	1.03

The second hierarchical logistic regression was used to predict whether the student would choose the same institution if starting over again (definitely yes or probably yes vs. probably no or definitely no) using experiences with faculty engagement indicators as potential predictors. Results are presented in Table 19. After adjusting for the significant covariates, gender and

Table 19

Hierarchical Logistic Regression on Satisfaction (Would Attend Same Institution) Using Experiences with Faculty Engagement Indicators as Potential Predictors (n = 357)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
1	Gender				3.44	1	.064	0.59
	Any time working off campus	1.96	1	.161				
2	Any time caring for dependents				6.40	1	.011	0.46
3	Effective Teaching Practices				8.31	1	.004	1.03
4	Student-Faculty Interaction				7.41	1	.006	1.03

any time caring for dependents, both experiences with faculty engagement indicators added to the prediction of satisfaction, as measured by students' reports that they would attend the same institution.

Campus Environment as a Predictor of Achievement, Retention, and Student Satisfaction

The role of the NSSE theme of campus environment, which includes the Engagement Indicators (a) quality of interactions, and (b) supportive environment, was examined to determine if it could significantly predict achievement, retention, and student satisfaction. This question was tested using four regression analyses.

For the dependent variable of achievement, a hierarchical regression on grade point average was conducted. The first block consisted of covariates that were found significant in preliminary analyses, namely, Asian ethnicity, Black ethnicity and any time working on campus. These were considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Once all independently significant covariates were entered, the second block in the regression was initiated, and the two campus environment engagement indicators

were considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Results of this analysis are presented in Table 20.

Table 20

Hierarchical Regression on Achievement (Grade Point Average) Using Campus Environment Engagement Indicators as Potential Predictors

Step	*Variables Entered*	R^2	R^2 *Change*	*F Change*	*df*	*p*	*β*	*t*	*p*
1	Black	.065	.065	23.88	1,346	.000	-.194	-3.70	< .001
2	Asian	.082	.017	6.38	1,345	.012	.127	2.48	.014
3	Any time working on campus	.093	.011	4.31	1,344	.039	-.105	-2.04	.042
4	Quality of Interactions	.116	.023	8.81	1,343	.003	.153	2.97	.003

After adjusting for significant covariates, one of the two campus environment engagement indicators, quality of interactions, added significantly to the prediction of achievement, as measured by self-reported grade point average.

For the dependent variable of retention, a stepwise logistic regression on enrollment in the next Fall semester was conducted. Stepwise selection was based on the significance of the score statistic. No covariates were considered for entry into the regression equation since none were found significantly related to retention in preliminary analyses. Results are presented in Table 21.

Table 21

Stepwise Logistic Regression on Retention Using Campus Environment Engagement Indicators as Potential Predictors (n = 361)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
1	Quality of Interactions				5.02	1	.025	1.03

	Supportive Environment	3.40	1	.065

One of the two campus environment engagement indicators, quality of interactions, was found significantly predictive of retention as measured by enrollment in the next Fall semester.

For the dependent variable of satisfaction, two hierarchical logistic regressions were conducted. The first was used to predict positive (excellent or good vs. fair or poor) academic experience using campus environment engagement indicators as potential predictors. Results are presented in Table 22.

Table 22

Hierarchical Logistic Regression on Satisfaction (Positive Experience) Using Campus Environment Engagement Indicators as Potential Predictors (n = 349)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
	Any time working off campus	2.52	1	.112				
1	Supportive Environment				32.77	1	.000	1.09
2	Quality of Interactions				7.97	1	.005	1.04

As shown, after adjusting for any time working off campus, both campus environment engagement indicators added significantly to the prediction of satisfaction, as measured by positive evaluation of the academic experience.

The second hierarchical logistic regression was used to predict whether the student would choose the same institution if starting over again (definitely yes or probably yes vs. probably no or definitely no) using campus environment engagement indicators as potential predictors. Results are presented in Table 23. After adjusting for the significant covariates, both campus environment engagement indicators added to the prediction of satisfaction, as measured by students' reports that they would attend the same institution.

Table 23

Hierarchical Logistic Regression on Satisfaction (Would Attend Same Institution) Using Campus Environment Engagement Indicators as Potential Predictors (n = 347)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*P*	*Wald*	*df*	*p*	*Odds Ratio*
1	Gender				2.76	1	.097	0.61
2	Any time working off campus				1.99	1	.159	0.66
	Any time caring for dependents	1.49	1	.222				
3	Supportive Environment				14.34	1	.000	1.04
4	Quality of Interactions				8.45	1	.004	1.04

High-Impact Practices as a Predictor of Achievement, Retention, and Student Satisfaction

The NSSE high-impact practices (for freshmen) overall score was examined to determine if it could significantly predict achievement, retention, and student satisfaction. This question was tested using four regression analyses.

For the dependent variable of achievement, a hierarchical regression on grade point average was conducted. The first block consisted of covariates that were found significant in preliminary analyses, namely, Asian ethnicity, Black ethnicity and time working on campus. These were considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Once all independently significant covariates were entered, the second block in the regression was initiated, and any high impact practices was considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Results of this analysis are presented in Table 24. After adjusting for ethnicity variables, the variable any high impact practices was unable to add significantly to the prediction of achievement as measured by grade point average.

Table 24

Hierarchical Regression on achievement (grade point average) Using Any High Impact Practices as the Potential Predictor

Step	*Variables Entered*	R^2	R^2 *Change*	*F Change*	*df*	*p*	*β*	*t*	*p*
1	Black	.054	.054	20.14	1,356	.000	-.211	-4.08	< .001
2	Asian	.071	.018	6.83	1,355	.009	.135	2.61	.009

For the dependent variable of retention, a stepwise logistic regression on enrollment in the next Fall semester was conducted. Stepwise selection was based on the significance of the score statistic. No covariates were considered for entry into the regression equation since none were found significantly related to retention in preliminary analyses. Results are presented in Table 25. As shown, the variable any high-impact practices was not found significantly predictive of retention.

Table 25

Stepwise Logistic Regression on Retention Using any High Impact Practices as the Potential Predictor (n = 361)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
	High Impact Practices	0.15	1	.700				

For the dependent variable of satisfaction, two hierarchical logistic regressions were conducted. The first was used to predict positive (excellent or good vs. fair or poor) academic experience using any high-impact practices as the potential predictor. Results are presented in Table 26. After adjusting for any time working off campus, the variable any high impact practices did

not add significantly to the prediction of satisfaction, as measured by positive evaluation of the academic experience.

Table 26

Hierarchical Logistic Regression on Satisfaction (Positive Experience) Using Any High Impact Practices as the Potential Predictor (n = 369)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
1	Any time working off campus				4.28	1	.039	0.54
	High Impact Practices	0.05	1	.822				

The second hierarchical logistic regression was used to predict whether the student would choose the same institution if starting over again (definitely yes or probably yes vs. probably no or definitely no) using any high-impact practices as the potential predictor. Results are presented in Table 27.

Table 27

Hierarchical Logistic Regression on Satisfaction (Would Attend Same Institution) Using Any High Impact Practices as the Potential Predictor (n = 356)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
	Gender	2.84	1	.092				
1	Any time working off campus				4.83	1	.028	0.55
	Any time caring for dependents	2.23	1	.136				
	High Impact Practices	0.40	1	.527				

After adjusting for any time working off campus, the variable any high impact practices did not add significantly to the prediction of satisfaction, as measured by students' reports that they would attend the same institution.

What Combination of Practices and Indicators Best Significantly Predict Achievement, Retention, and Student Satisfaction?

This study examined what combination of scores, including the three NSSE high-impact practices overall score and the ten NSSE engagement indicators, best predicts achievement, retention, and student satisfaction. This question was tested using four regression analyses.

For the dependent variable of achievement, a hierarchical regression on grade point average was conducted. The first block consisted of covariates that were found significant in preliminary analyses, namely, Asian ethnicity, Black ethnicity and any time working on campus. These were considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Once all independently significant covariates were entered, the second block in the regression was initiated, and all ten engagement indicators, as well as any high impact practices, were considered for entry into the regression equation in a stepwise fashion using an alpha of .05 as the criterion for entry. Results of this analysis are presented in Table 28.

Table 28

Hierarchical Regression on Achievement (Grade Point Average) Using All Engagement Indicators and Any High Impact Practices as Potential Predictors

Step	*Variables Entered*	R^2	R^2 *Change*	*F Change*	*df*	*p*	*β*	*t*	*p*
1	Black	.056	.056	18.24	1,308	< .001	-.213	-3.93	< .001
2	Asian	.071	.015	4.84	1,307	.029	.089	1.67	.096
3	Effective Teaching Practices	.115	.045	15.42	1,306	.000	.122	2.11	.035
4	Discussions with Diverse Others	.128	.013	4.67	1,305	.031	-.142	-2.46	.014
5	Learning Strategies	.144	.016	5.69	1,304	.018	.125	2.08	.038

6	Quantitative Reasoning	.159	.014	5.13	1,303	.024	-.185	-3.03	.003
7	Quality of Interactions	.174	.015	5.50	1,302	.020	.139	2.46	.015
8	Higher-Order Learning	.187	.013	4.86	1,301	.028	.139	2.21	.028

After adjusting for significant ethnicity covariates, six of the ten NSSE engagement indicators could add significantly to the prediction of achievement, as measured by grade point average. All 8 predictors explained 18.7% of the variance in achievement. Two of the engagement indicators were negatively predictive: Discussions with Diverse Others had a beta weight of -.142 and quantitative reasoning had a beta weight of -.185. The other four engagement indicators were positively predictive.

For the dependent variable of retention, a stepwise logistic regression on enrollment in the next Fall semester was conducted. Stepwise selection was based on the significance of the score statistic. No covariates were considered for entry into the regression equation since none were found significantly related to retention in preliminary analyses. Results are presented in Table 29. As shown, only effective teaching practices was found to be significantly predictive.

Table 29

Stepwise Logistic Regression on Retention Using All Engagement Indicators and Any High Impact Practices as Potential Predictors (n = 321)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
	Higher-Order Learning	0.11	1	.738				
	Reflective & Integrative Learning	0.23	1	.634				
	Learning Strategies	0.28	1	.597				
	Quantitative Reasoning	0.51	1	.473				
	Collaborative Learning	0.04	1	.834				

	Discussions with Diverse Others	1.44	1	.231				
	Student-Faculty Interaction	2.29	1	.130				
1	Effective Teaching Practices				6.90	1	.009	1.04
	Quality of Interactions	2.78	1	.096				
	Supportive Environment	3.24	1	.072				
	High Impact Practices	0.02	1	.877				

For the dependent variable of satisfaction, two hierarchical logistic regressions were conducted. The first was used to predict positive (excellent or good vs. fair or poor) academic experience using all engagement indicators and any high impact practices as potential predictors. Results are presented in Table 30. Of all the potential predictors, the two campus environment engagement indicators were found significantly predictive of satisfaction, as measured by positive evaluation of the academic experience.

Table 30

Hierarchical Logistic Regression on Satisfaction (Positive Experience) Using All Engagement Indicators and Any High Impact Practices As Potential Predictors (n = 310)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
	Any time working off campus	2.28	1	.131				
	Higher-Order Learning	2.27	1	.132				
	Reflective & Integrative Learning	1.57	1	.210				
	Learning Strategies	0.00	1	.960				
	Quantitative Reasoning	2.28	1	.131				
	Collaborative Learning	0.07	1	.795				
	Discussions with Diverse Others	0.96	1	.328				
	Student-Faculty Interaction	0.24	1	.622				
	Effective Teaching Practices	2.14	1	.144				

1	Supportive Environment				26.90	1	.000	1.09
2	Quality of Interactions				7.99	1	.005	1.04
	High Impact Practices	2.58	1	.108				

The second hierarchical logistic regression was used to predict whether the student would choose the same institution if starting over again (definitely yes or probably yes vs. probably no or definitely no) using all engagement indicators and any high impact practices as potential predictors. Results are presented in Table 31. Of all the potential predictors, the two campus environment engagement indicators were again found significantly predictive of satisfaction, as measured by students' reports that they would attend the same institution if starting over again.

Table 31

Hierarchical Logistic Regression on Satisfaction (Would Attend Same Institution) Using All Engagement Indicators and Any High Impact Practices as Potential Predictors (n = 308)

		Variables not in the Equation			Variables in the Equation			
Step		*Score*	*df*	*p*	*Wald*	*df*	*p*	*Odds Ratio*
	Gender	2.80	1	.094				
	Any time working off campus	2.50	1	.114				
	Any time caring for dependents	3.13	1	.077				
	Higher-Order Learning	2.27	1	.132				
	Reflective & Integrative Learning	0.64	1	.425				
	Learning Strategies	0.07	1	.796				
	Quantitative Reasoning	0.45	1	.501				
	Collaborative Learning	0.56	1	.455				
	Discussions with Diverse Others	0.13	1	.723				
	Student-Faculty Interaction	1.14	1	.286				
	Effective Teaching Practices	2.11	1	.146				
1	Quality of Interactions				10.52	1	.001	1.04

2	Supportive Environment				10.56	1	.001	1.04
	High Impact Practices	0.03	1	.862				

Tables 32 through 36 present a summary of the research results. Significant covariates and independent variables are noted with *. Within each regression, these variables are significant in combination with each other, each contributing significantly to the prediction. Negative correlations are indicated by (-). Variables with both an * as well as (-) are significantly negatively correlated.

Table 32

Summary of Statistical Results Correlating Academic Challenge with Achievement, Retention, and Satisfaction

Hypothesis	Dependent Variable	Covariates	Independent Variables
1	Achievement (Grades)	Asian ethnicity* Black ethnicity (-) * Time worked on campus (any vs. none)	Higher-Order Learning* Reflective & Integrative Learning Learning Strategies* Quantitative Reasoning (-)*
	Retention (Enrolled next year)	none	Higher-Order Learning Reflective & Integrative Learning Learning Strategies Quantitative Reasoning
	Satisfaction (Positive experience)	Time worked off campus (any vs. none) (-) *	Higher-Order Learning* Reflective & Integrative Learning (-) * Learning Strategies* Quantitative Reasoning
	Satisfaction (Would choose same institution)	Gender (-) * Time worked off campus (any vs. none) (-) *	Higher-Order Learning*

		Time caring for dependents (any vs. none)	Reflective & Integrative Learning Learning Strategies Quantitative Reasoning

*Note: Statistical significance is noted with **

Table 33 presents a summary of the research results. Significant covariates and independent variables are noted with *. Within each regression, these variables are significant in combination with each other, each contributing significantly to the prediction. Negative correlation indicated by (-).

Table 33

Summary of Statistical Results Correlating Learning with Peers with Achievement, Retention, and Satisfaction

Hypothesis	Dependent Variable	Covariates	Independent Variables
2	Achievement (Grades)	Asian ethnicity* Black ethnicity (-) * Time worked on campus (any vs. none) (-) *	Collaborative Learning Discussions with Diverse Others
	Retention (Enrolled next year)	None	Collaborative Learning Discussions with Diverse Others
	Satisfaction (Positive experience)	Time worked off campus (any vs. none)	Collaborative Learning Discussions with Diverse Others
	Satisfaction (Would choose same institution)	Gender (-) * Time worked off campus (any vs. none)	Collaborative Learning Discussions with Diverse Others*

*Note: Statistical significance is noted with **

Table 34 present a summary of the research results. Significant covariates and independent variables are noted with *. Within each regression, these variables are significant in combination with each other, each contributing significantly to the prediction.

Table 34

Summary of Statistical Results Correlating Experiences with Faculty with Achievement, Retention, and Satisfaction

Hypothesis	Dependent Variable	Covariates	Independent Variables
3	Achievement (Grades)	Asian ethnicity* Black ethnicity (-) * Time worked on campus (any vs. none) (-) *	Student-Faculty Interaction Effective Teaching Practices
	Retention (Enrolled next year)	None	Student-Faculty Interaction Effective Teaching Practices*
	Satisfaction (Positive experience)	Time worked off campus (any vs. none)	Student-Faculty Interaction* Effective Teaching Practices*
	Satisfaction (Would choose same institution)	Gender (-) * Time worked off campus (any vs. one) Time caring for dependents (any vs. none) (-) *	Student-Faculty Interaction* Effective Teaching Practices*

*Note: Statistical significance is noted with **

Table 35 present a summary of the research results. Significant covariates and independent variables are noted with *. Within each regression, these variables are significant in combination with each other, each contributing significantly to the prediction.

Table 35

Summary of Statistical Results Correlating Campus Environment with Achievement, Retention, and Satisfaction

Hypothesis	Dependent Variable	Covariates	Independent Variables
4	Achievement (Grades)	Asian ethnicity* Black ethnicity (-) * Time worked on campus (any vs. none) (-) *	Quality of Interactions* Supportive Environment
	Retention (Enrolled next year)	None	Quality of Interactions* Supportive Environment
	Satisfaction (Positive experience)	Time worked off campus (any vs. none)	Quality of Interactions* Supportive Environment*
	Satisfaction (Would choose same institution)	Gender Time worked off campus (any vs. none) Time caring for dependents (any vs. none)	Quality of Interactions* Supportive Environment*

*Note: Statistical significance is noted with **

Table 36 present a summary of the research results. Significant covariates and independent variables are noted with *. Within each regression, these variables are significant in combination with each other, each contributing significantly to the prediction.

Table 36

Summary of Statistical Results Correlating NSSE High Impact Practices with Achievement, Retention, and Satisfaction

Hypothesis	Dependent Variable	Covariates	Independent Variables
5	Achievement (Grades)	Asian ethnicity* Black ethnicity (-) * Time worked on campus (any vs. none)	High Impact Practices (any vs. none)
	Retention (Enrolled next year)	None	High Impact Practices (any vs. none)
	Satisfaction (Positive experience)	Time worked off campus (any vs. none) (-) *	High Impact Practices (any vs. none)
	Satisfaction (Would choose same institution)	Gender Time worked off campus (any vs. none) (-) * Time caring for dependents (any vs. none)	High Impact Practices (any vs. none)

*Note: Statistical significance is noted with **

Table 37 present a summary of the research results. Significant covariates and independent variables are noted with *. Within each regression, these variables are significant in combination with each other, each contributing significantly to the prediction.

Table 37

What Combination of Scores Best Predicts Achievement, Retention, and Satisfaction

Hypothesis	Dependent Variable	Covariates	Independent Variables
6	Achievement	Asian ethnicity	Higher-Order Learning*

	(Grades)	Black ethnicity (-) * Time worked on campus (any vs. none)	Reflective & Integrative Learning Learning Strategies* Quantitative Reasoning (-) * Collaborative Learning Discussion with Diverse Others (-) * Student-Faculty Interaction Effective Teaching Practices* Quality of Interactions* Supportive Environment High Impact Practices (any vs. none)
	Retention	None	Higher-Order Learning Reflective & Integrative Learning Learning Strategies Quantitative Reasoning Collaborative Learning Discussion with Diverse Others Student-Faculty Interaction Effective Teaching Practices* Quality of Interactions Supportive Environment High Impact Practices (any vs. none)
	Satisfaction (Positive experience)	Time worked off campus (any vs. none)	Higher-Order Learning Reflective & Integrative Learning Learning Strategies Quantitative Reasoning Collaborative Learning Discussion with Diverse Others Student-Faculty Interaction Effective Teaching Practices Quality of Interactions* Supportive Environment* High Impact Practices (any vs. none)
	Satisfaction (Would choose same institution)	Gender Time worked off campus (any vs. none) Time caring for dependents (any vs. none)	Higher-Order Learning Reflective & Integrative Learning Learning Strategies Quantitative Reasoning Collaborative Learning Discussion with Diverse Others Student-Faculty Interaction Effective Teaching Practices Quality of Interactions* Supportive Environment*

	High Impact Practices (any vs. none)

*Note: Statistical significance is noted with **

CHAPTER IV

DISCUSSION

This chapter presents trends and themes resulting from the analysis of the data as they relate to achievement, satisfaction, and retention. This discussion section also explores the similarities and discrepancies with previous research.

Covariates Relationships with the Dependent Variables

The NSSE measures demographic information as well as participation in activities that this study has determined to be non-engagement, or non-involvement factors. The demographic variables used in this study as reported in the NSSE included gender and racial or ethnic identification

Variables measured by the NSSE that have been determined by previous studies to influence engagement (non-involvement factors) used in this study included working for pay off campus, working for pay on campus, time spent relaxing and socializing (time with friends, video games, TV or video, keeping up with friends online, etc.), and providing care for dependents (children, parents, etc.).

A key concept in effective learning and success in the educational process shown by previous studies is student involvement. Student involvement refers to the amount of physical and psychological energy that the student devotes to the academic experience. The greater the student's degree of involvement, the greater the learning and personal development. Indeed, non-involvement, according to previous studies, is correlated with decreased achievement, satisfaction, and retention. The results of this study do support the importance of engagement and several covariates had relationships with the dependent variables (Anderson, 2003a; Kuh, 2001a).

Specifically, time worked off and on campus was negatively correlated with student satisfaction (both Positive Experience and Would Choose Same Institution) for research question one. For research question two, time worked on campus was negatively correlated with achievement. For research question four, time worked on campus was negatively correlated with achievement. For research question five, time worked off campus was negatively correlated with satisfaction (both Positive Experience and Would Choose Same Institution). For research question six, however, time worked on or off campus was not statistically significant following regression analysis. This study supports existing research that time worked on or off campus is negatively correlated with student achievement and satisfaction (Astin, 1996); however, the results of this study differ from previous studies. Previous studies (Astin, 1975; Dundes & Marx, 2006) showed that students working 15-20 hours a week often report higher GPAs than those who do not work at all. This difference could be because most of the students in the study did not work at all, thus creating a bimodal distribution of the results and a dichotomized statistical analysis. Another possibility is that these first-year students are still on a learning curve on how to be college students and still learning how to balance studies, college life, work, and socializing.

Asian ethnicity was positively correlated with achievement for research questions one through five. It was also found that black ethnicity was significantly negatively correlated with achievement in all six research questions. Ethnicity did not seem to be statistically significant in retention or satisfaction.

Caring for dependents, an activity previous studies showed as diminishing student engagement (Astin, 1996; Hu & Kuh, 2003; Hu et al., 2008), was shown to be statistically significant only in research question 3, experiences with faculty. Time caring for dependents was negatively correlated with being willing to choose the same institution again, but not significantly

correlated with achievement or retention. This result could be affected by the small number of students in the study who cared for dependents and the dichotomization of the statistical results. Another possibility is that the students who did care for dependents were committed to finishing what they had started and keeping up with studies, but perhaps felt the institution could have done more to help them with the dual burden of academics and dependent care.

Research questions one, two, and three, which dealt with academic challenge, learning with peers, and experiences with faculty respectively, showed that male gender was negatively correlated with being willing to choose the same institution again.

Does the NSSE Theme of Academic Challenge Significantly Predict Achievement, Retention, and Student Satisfaction?

The components of academic challenge, which are higher-order learning, reflective & integrative learning, learning strategies, and quantitative reasoning, are clearly shown in previous studies (Braxton & McClendon, 2001; Umbach & Wawrzynski, 2005) to correlate with student success. Active learning is purported to foster student learning and higher order thinking activities and class discussion encourages social integrating and has a positive influence on student persistence. In research question one, which is academic challenge, higher-order learning and learning strategies are positively correlated with achievement and a positive experience. Higher order learning is also positively correlated with the willingness to choose the same institution again. In research question six, which is a combination of scores, both higher-order learning and learning strategies are positively correlated with achievement. Surprisingly, quantitative reasoning is negatively correlated with achievement in research question one, academic challenge, and research question six, combination of scores. Another finding is that reflective & integrative learning is negatively correlated with a positive experience in research question one, academic

challenge. This would seem to contradict research that greater engagement with the learning process increases the learning outcome (Braxton & McClendon, 2001; Kuh, 2009). Apparently, certain types of academic challenge used at this institution, such as quantitative reason and reflective and integrative learning, have a negative effect on achievement and satisfaction and this would be worth pursuing in a future study.

Does the NSSE Theme of Learning with Peers Significantly Predict Achievement, Retention, and Student Satisfaction?

The learning with peers engagement indicators with its two items of learning with peers and discussions with diverse others, has received much attention in educational research in recent years (Filkins & Doyle, 2002; Kuh et al., 2008; Pike et al., 2011). Constructivist learning theory emphasizes the construction of knowledge in collaboration with other learners. With the exponential increase in distance education, collaborative learning is seen by some as the solution to student isolation and drop out (Zhao & Kuh, 2004). In previous studies, cooperative learning is shown to be more effective than traditional classroom instructional techniques and working together and engaging in teaching one another works to enrich the educational experience (Astin, 1996; Johnson, 1981; Kuh et al., 2008). Collaborative learning is presented to be especially effective for low-income and first-generation students even more than non-disadvantaged students (Filkins & Doyle, 2002) as it facilitates the engagement not only with the course material, but also with others who can be of assistance.

In this study, however, learning with peers was positively correlated only with choosing the same institution again in research question two, learning with peers, but not correlated with achievement, retention, or student satisfaction in the other five research questions. Also, contrary to previous studies, this study found discussion with diverse others to be negatively correlated

with achievement in research question six, combination of scores. The reasons for this are not evident from the scope of this study.

Does the NSSE Theme of Experiences with Faculty Significantly Predict Achievement, Retention, and Student Satisfaction?

In considering this NSSE theme, it is important to note that this theme is divided into two related, but potentially very different, engagement indicators: Student-faculty interaction and effective teaching practices. Student-faculty interaction includes interaction with the teacher or faculty regarding career plans, activities other than coursework, discussions outside of class, and the discussion of academic performance. According to previous studies, engagement between the student and the teacher is perceived as the most important factor in student motivation and involvement (Astin, 1993; Guerrero & Rod, 2013; Kim & Lundberg, 2016; Pascarella, 1980). Effective teaching practices includes items described in previous studies (Astin, 1985; Chickering & Gamson, 1987; Hu & Kuh, 2003) as ingredients for success in education. Some of these items for educational success are: clearly explaining course goals and requirements, teaching in an organized way, using examples and illustrations, and prompt feedback to the students.

In this study, both student-faculty interaction and effective teaching practices are positively correlated with a positive experience & would choose same institution in research question three, which is experiences with faculty. Effective teaching practices is positively correlated with retention in research question three, experiences with faculty. In research question six, combination of scores, effective teaching practices is positively correlated with both achievement and retention. It is significant that in research question six, combination of scores, effective teaching practices is the only independent variable shown to be statistically significant for retention. It is

clear from this study that effective teaching practices are significantly correlated with achievement and retention. This is in keeping with findings from previous studies (Astin, 1993; Astin, 1996; Chickering & Gamson, 1987; Hu & Kuht, 2002).

While the engagement indicator experiences with faculty and the two corresponding items student-faculty interaction and effective teaching practices are important, a case could be made by an instructional designer working in the field of distance education that the items in the effective teaching practices engagement indicator, which are: clearly explained course goals and requirements; taught course sessions in an organized way; used examples or illustrations to explain difficult points; provided feedback on a draft or work in progress; provided prompt and detailed feedback on tests or completed assignments, are not limited to the theme of experiences with faculty, but could also be considered student-content interaction more in keeping with the NSSE engagement indicator of academic challenge. For instance, an instructional designer could create a distance education course with no faculty present that should be able to implement the NSSE items under effective teaching practices. This being the case, it may not be correct to correlate the statistically significant results for achievement and retention with the NSSE engagement indicator of experiences with faculty, but rather with the NSSE engagement indicator academic challenge.

Does the NSSE Theme of Campus Environment Significantly Predict Achievement, Retention, and Student Satisfaction?

In this study, both quality of interactions and a supportive environment were positively correlated with a positive experience and would choose same institution in research question three, experience with faculty. Also, quality of interactions was positively correlated with

achievement and retention in research question three, experience with faculty. In research question six, combination of scores, quality of interactions is positively correlated with achievement as well as a positive experience and would choose the same institution again. In research question six, combination of scores, a supportive environment is positively correlated with a positive experience and would choose the same institution again.

It is surprising and significant that a supportive environment was not correlated with achievement or retention in either research question four addressing campus environment or six addressing combination of scores. Previous studies point to the importance of quality of interactions and a supportive environment for institutional commitment and persistence (Astin, 1996; Kuh et al., 2007; Zhao & Kuh, 2004). To increase achievement and retention, most schools offer classes and programs which attempt to provide a supportive environment (Pascarella & Terenzini, 1980; Shinde, 2010): provide support to help students succeed academically; encouraging contact among students from different backgrounds; provide support for overall well-being; and help manage nonacademic responsibilities. In contrast, this study shows that a supportive environment leads to satisfied students, but not retained or achieving students. This seems to contradict the logical assumption that a happy student is a retained and achieving student. It could be that a student differentiates between the value of an effective and rigorous academic program with the value of the satisfaction that comes from quality of interactions and a supportive environment, and considers the former as more important than the later. It is possibly more important to the student that they learn well than that they relate well to the environment or to others.

In the NSSE, the engagement indicator quality of interactions indicates the quality of interactions with students, advisors, faculty, student services, and administrative staff. It is not exactly clear what the word "quality" means in the minds of the students taking the survey, but common usage would indicate openness, efficiency, friendliness, and accessibility. A possible measure of institutional or business effectiveness, and therefore a definition of "quality interactions", may be achieved by answering the question: In the minds of the students, is it important that they perceive the institution exists for the student rather than the student exists for the institution?

Does the NSSE High-Impact Practices Overall Score Significantly Predict Achievement, Retention, and Student Satisfaction?

Surprisingly, none of the high impact practices were positively correlated with achievement, retention, or satisfaction. This could be due to how few of the freshmen students were involved in High-Impact practices. Since more than half of the students did not report any high impact practices, this variable was dichotomized and therefore the results may not accurately represent the importance of high impact practices as described by previous studies.

Despite the lack of correlation between High-impact practices and achievement, retention, and satisfaction, they are still worthy of further research (Kilgo, Ezell Sheets, & Pascarella, 2015). A report of the study done by the Association of American Colleges and Universities four practices, including first-year seminars, learning communities, service learning and undergraduate research revealed that students who participate in the practices are retained at a higher rate than those who do not (Brownell & Swaner, 2009). Furthermore, the practices result in higher rates of faculty and peer interaction, increased critical thinking and writing skills as well as higher levels of engagement. These practices correspond to the high-impact practices present

in the NSSE, and therefore should be explored further with groups having more extensive use of high-impact practices.

What Combination of Scores of the NSSE High-Impact Practices and NSSE Engagement Indicators Best Predicts Achievement, Retention, and Student Satisfaction?

Research question six, looking at a combination of scores, allows the opportunity to determine the best predictors, when all the variables are put together, of achievement, retention, and satisfaction. Significant correlations and significant themes or trends have already been mentioned in the previous research questions, but some items bear repeating. Higher-order learning, learning strategies, effective teaching practices, and quality of interactions were positively correlated with achievement. Quantitative reasoning and discussions with diverse others were both negatively correlated with achievement. Effective teaching practices is the only variable positively correlated with retention. Both quality of interactions and supportive environment are positively correlated with a positive student experience and choosing the same institution again. It is surprising to see, when all the NSSE variables are placed together, that only five variables out of 11 are statistically significant for the desired outcomes of achievement, retention, and satisfaction. Previous studies indicated the importance of all the engagement indicators and items (Kuh, 2001b; Kuh, 2008; Kuh, 2009; Kuh et al., 2008) The significant independent variables of higher-order learning, learning strategies, effective teaching practices, quality interactions, and supportive environment can be seen as an expanded application of the two engagement categories of student-content and student-teacher interaction (Anderson, 2003a), which applied to both face-to-face and distance education.

Limitations

This study is limited to non-transfer freshman over a two-year period at a single university and therefore may be of limited value when applied to other institutions in different parts of the country. Since the study focused on freshman, it was not possible to make full use of the NSSE data since three of the high-impact practices, internship or field experience, study abroad, and culminating senior experience, applied only to seniors.

This study on the correlation of engagement to academic success as measured by achievement, retention, and satisfaction is limited to the NSSE survey questions. This survey, while research based and very broad in its scope, certainly does not exhaust either the possibilities of types of engagement nor the educational consequences of that engagement. In future studies, additional types of engagement could be explored as well as dependent variables that go beyond achievement, satisfaction, and retention.

An example of study limitations is found in the topic of high-impact practices. While research shows the importance of certain educational practices, this study was limited to only three NSSE dictated practices that applied to freshman students. The freshman students had limited time and ability to make full use of the high impact practices the NSSE used identified. First year students are on a learning curve and are getting used to being a college student. This learning curve may delay taking advantage of high-impact practices offered by the institution. This freshman learning curve may also be the reason why two independent variables, quantitative reasoning and reflective & integrative learning were negatively correlated with achievement and satisfaction. Three covariates, time worked off campus, time worked on campus, and time caring for dependents, were more negatively correlated with educational goals than shown by previous

studies. This could also be due to the study being limited to first year students still finding how to be a college student.

A limitation of the NSSE is that while students reported their perceptions of different learning activities, or experiences with faculty, we do not really know a lot about what those experiences or encounters entailed. The NSSE does not give us information on the duration or intensity of the engagement experiences and therefore correlations are based on simply the existence of engagement with no indication of the quality of the engagement. Additional information regarding the instructional context would be helpful for future studies.

An important dependent variable, achievement, relied on self-reported data from the students rather than official GPA from the university. Given the possibility that a student's recall and perception may be incorrect, future studies should use official university GPA information for this important data source rather than the self-reported grade span the NSSE uses.

An additional limitation is that more than half of the freshmen had not participated in high-impact practices and this variable was dichotomized for statistical analysis. Even though retention is a major part of this study, a limiting factor is the lack of data regarding why non-retained students did not return the next year and how many of them continue their education elsewhere for non-study related reasons.

Another limitation is that few of the freshmen worked off or on campus or were involved in caring for dependents, so the results for these covariates may be of limited value. More than twice as many females participated in the NSSE survey as males, which may have presented results not in keeping with the total student body.

The final sample included 493 freshman students, but several of the questions were tested using a considerably smaller sample due to missing data. For the non-involvement factors, of the

total final sample of 493 freshman students, 376 responded to the question of working for pay off campus, 375 responded to the question of working for pay on campus, 379 responded to the question of relaxing and socializing, and 374 responded to the question of providing care for dependents. For the dependent variables, of the total final sample of 493 freshman students, 374 responded to grade average, 374 responded to evaluating the educational experience, and 377 responded to the question of choosing the same institution they are now attending.

Implications for Institutions, Teachers, and Instructional Designers

In some arguable order of priority, achievement, retention, and satisfaction are important to all institutions, teachers, and instructional designers. This study offers further insight on the importance of engagement in the educational process. Also, this study offers some helpful guidelines for how an institution of higher education can utilize limited resources to achieve maximum output in terms of highly achieving, satisfied students, who stay with the same institution at least past their freshman year.

An overlooked and perhaps neglected element in higher-education that seems to be central to achievement and student retention is effective teaching practices (Astin, 1985; Chickering & Gamson, 1987; Harbour, Evanovich, Sweigart, & Hughes, 2015; Magsuga-Gage, Simonsen, & Briere, 2012). It could be implied by some higher education institution's policies and procedures that the quality of their professors' teaching practices is not as important as their professors' academic standing or academic research and publications. What may count more in a professor's career track at a college or university, in some cases, is not satisfied students that are retained by the university, but research publications that raise the prestige and recognition of the university. Jencks and Riesman (1968) describe the price that is paid when teaching is neglected:

> No doubt most professors prefer it when their courses are popular, their lectures applauded, and their former students appreciative. But since such successes are of no help in getting a salary increase, moving to a more prestigious campus, or winning their colleagues' admiration, they are unlikely to struggle as hard to create them as to do other things…Many potentially competent teachers do a conspicuously bad job in the classroom because they know that bad teaching is not penalized in any formal way (p. 531).

Indeed, some educators have doubts as to whether higher education can really transform itself into a learning culture since even after decades of attempted reform faculty and administrators at research universities have not shifted appropriate attention from teaching to learning (Shapiro, 2006). He argues that "a fundamental shift in promotion and tenure criteria is needed for colleges and universities, and research universities in particular, to become learner centered" (Shapiro, 2006p. 41). In academia some feel that teaching is considered secondary and therefore those who aspire to teach or enjoy it are not good scholars or intellects (Boyer, 1991). It is recognized that expecting faculty to be good teachers as well as good researchers is to set a demanding standard, but teaching and research need to be brought into better balance and the nation's ranking universities are encouraged to extend special status and salary incentives to those professors who teach and are particularly effective in the classroom (Boyer, 1991).

This study shows that effective teaching practices and quality interactions are important to have achieving, retained, and satisfied students. Scholarly research is important to have something significant to teach, but effective teaching practices and quality interactions may be a missing ingredient in higher education. Teaching and scholarship should not be viewed as antithetical categories which compete for the professor's time and attention, but as mutually beneficial components since teaching requires substantive scholarship and it is a distinct scholarly effort

(Badley, 2003). The normally accepted criteria for tenure (research, publications, etc.) could potentially correlate with effective teaching and academic freedom.

Picture the average freshman making their bewildered way through the university system. The new higher education student needs to find a system that is friendly and open, faculty that commit themselves to assisting the student to become a scholar, student services and administrative staff that appreciate their role in the formation of achieving and satisfied students, and faculty and administration as interested in helping the student as in building their own careers.

Educators at the institutions must do their best to create challenging courses that force students to do their best using higher-order learning. Course designers and teachers must create challenging and stimulating courses that force the students to do their best using higher-order learning and not simply memorization, recall, and other lower level learning practices. Teachers need to uphold high standards while expecting the best from their students. They need to resist demands for easy classes leading to easy grades, doing their best to create challenging courses that force the students to do their best using higher-order learning. Effective teaching practices, learning strategies, higher-order learning, quality of interactions, and a supportive environment have all been shown to significantly correlate with achievement, retention, and satisfaction (Astin, 1996; Pascarella & Terenzini, 1980; Umbach & Wawrzynski, 2005).

There are few surprises as to what constitutes effective teaching practices in the classroom today. The literature is vast and in most cases uncontested and stable: clearly explained course goals and requirements; course sessions taught in an organized way; examples and illustrations used to explain difficult points; timely and detailed feedback; engagement with the content and the teacher; high expectations communicated to the student (Astin, 1985; Chickering & Gamson, 1987) (Harbour et al., 2015). An institution's culture and practice must attract, reward,

develop, and monitor effective teachers. In summary, the institutional culture needs to encourage higher-order learning, effective teaching practices, quality interactions and a supportive environment.

Because quality of interactions and a supportive environment are important for achievement and satisfaction (Shinde, 2010), school administrators as well as educators need to continuously work at quality interactions between students and all levels of institutional administration and academics. The temptation would be to focus more on development and student recruiting than on making sure the current situation is one that students would want to attend or that donors might want to support. As an institution faces the reality of declining enrollment, high drop-out rates, and the subsequent drop in financial resources, the natural tendency could be to focus on increasing student recruitment, finding new sources of government and private funding, and raising the profile of the institution through targeted advertising. While all these efforts can be useful, they need to be done along with practices that create effective teachers, quality interactions, and a supportive environment.

Steps to Increase Institutional Effectiveness. A plan to increase institutional effectiveness could be a three-step process to improve: (1) the level of academic challenge; (2) the experiences with faculty and course material; (3) the campus environment.

The two statistically significant elements of academic challenge that need to be implemented in the academic program are higher-order learning and learning strategies. Higher-order learning involves applying facts, theories, or methods to practical problems or new situations. Students are most motivated to learn when they know that what they are learning is applicable to their lives or careers. The best way to practice and rehearse what they learn is to apply their learning towards solving realistic problems they may face in their career or everyday lives. The design of

courses need to emphasize the objectives of application, analysis, and creation of new ideas or solutions. If academic challenge is limited to lower levels of learning (recall, memorization) with limited opportunity for analysis, evaluation, and application, learning will be hindered (Harbour et al., 2015; Kilgo et al., 2015). It is challenging and takes extra work to design courses characterized by higher-order learning, and faculty need to be held to a higher standard of course creation. Another important element of academic challenge is the creation of learning strategies to assist the student in the engagement with the content. Learning strategies are actions that help students make the most of their learning efforts such as organization, creation, alliteration, and memory helps. It is not enough for the faculty to present information. They must also develop skill in presenting and organizing the information and the assignments so that students will be able to retain and use the information they are learning (Grabowski, 2004; Pascarella & Chapman, 1983; Tinto, 2004, 2012; Wittrock, 1974). This makes extra work for the faculty, but with time and training faculty can be encouraged to function at a higher-order of academic challenge.

The most significant variable for both achievement and retention is shown by this study to be effective teaching practices. The NSSE literature defines these practices as: (1) clearly explaining course goals and requirements; (2) teaching course sessions in an organized way; (3) using examples or illustrations to explain difficult points; (4) providing feedback on a draft or work in progress; (5) providing prompt and detailed feedback on tests or completed assignments. These types of practices are well recognized in instructional theory (Astin, 1996; Chickering & Gamson, 1987), and need to become an everyday part of a teachers practice in the classroom or online. Faculty training and evaluation need to include the content subjects correlated with effective teaching practices(Chickering & Gamson, 1987; Fink, 2013; Harbour et al., 2015; Kilgo et

al., 2015; McKee & Tew, 2013). Faculty tenure, as well as financial compensation, need to be linked with successfully implementing these and other effective teaching practices.

This study has shown that quality of interactions and a supportive environment are significantly related to student satisfaction, but not to retention in research question six. Quality of interactions is also significantly linked with achievement. Social learning theory proposes that people learn from one another via observation, imitation, and modeling (Bandura, 1986). Moore and Fetzner (2009) highlighted the importance of interaction for success in the educational process for retention and achievement. It could be argued that the best advertising and recruitment tool for an institution is a satisfied student or alumnus, and that a happy and connected student is an achieving student. Quality of interactions and a supportive environment includes not only the actions of the faculty, but also advisors, other students, student services, and other administrative staff. It would benefit an institution to have a user-friendly campus characterized by openness, helpfulness, friendliness, and efficiency. Faculty, staff, and administration all need to realize that they exist for the benefit of the student and not the student for them. The spirit and culture of a campus is shaped from the top down, so beginning with the upper levels of institutional administration, standards of engagement, courtesy, efficiency, and student friendliness need to be implemented.

Establishing standards of engagement for the institution as well as the other functions are important to assure both a quantity as well as quality of interaction that the institution has determined is necessary for its current student population. Students differ in levels of ability, maturity, and motivation, so it is important for an educational institution to determine what they will expect for teachers and administration to achieve institutional goals. Not all students are the same

nor are institutions the same, so it is necessary to establish what levels of engagement will be required. It is also important for institutions to communicate what standards of engagement are required both to the students as well as the teachers and administration. Standards need to be communicated, rewarded, enforced, and verified.

Future Research

This study included only two groups of non-transfer freshman students over a two-year period. Since the NSSE is administered to both freshmen and seniors, it would be helpful to include non-transfer seniors in a future study to confirm significant correlations over a longer period rather than just the freshman year. The variable of retention is probably most critical after the freshman year. However, including seniors in future studies would have several benefits. First, it would allow all six of the High-Impact practices to be included. High-Impact practices have been shown by previous research to be significant in educational success (Kuh et al., 2007). Also, more data would be available for correlations to be made with achievement and satisfaction among both freshmen and seniors.

While institutions of higher education may have different orders of priority for student achievement, retention, and satisfaction, it should be of concern that there is such a disparity of achievement among ethnic groups. Further research exploring the reason for the high correlation between black ethnicity and lower achievement could be conducted to assist admission procedures and train faculty members to be more effective in fostering student achievement among underachieving students accepted into the institution.

Another possibility for further research would be to explore the reasons for the negative correlation between both quantitative reasoning and discussions with diverse others with achievement. Apparently, not all engagement is conducive to an improved educational outcome and it would be helpful for the instructional design process to explore why this is the case.

The independent variables of quality of interactions and supportive environment need to be explored further to discover what elements are most important. A future study could more precisely define the NSSE category of campus environment engagement as to what the students value in terms of quality of interactions and a supportive environment. The elements of both quality of interactions as well as a supportive environment could be explored in greater detail to discover which elements have the highest correlation with both types of satisfaction addressed in this study.

Future studies need to delve into the subject category of high-impact pedagogy. This study focused on ten engagement indicators and three high-impact practices found in the NSSE survey, but a focus on high-impact pedagogy would focus on not only these limited factors, but on exploring all the many facets involved in the art, science, and profession of teaching to have maximum impact on the learning process of the students.

Would the results of this study apply to a distance education setting? Could effective teaching practices be implemented in the instructional design process and successfully implemented without a teacher being physically present? In the distance education environment, would learning with peers take on a more significant role in achievement, retention, and satisfaction?

In this study, more than twice as many females responded to the questionnaire as males. The reasons for this are not known. This study has shown that females are more responsive to surveys than men. Also, this study showed that males were less likely to choose the same institution

again and the reason for this could be explored to give males a more satisfying educational experience. Also, a future study could attempt to increase male participation in the survey so that the numbers between males and females is more equal giving a more balanced result.

Conclusion

While limited in its scope, this study does point to some specific steps that an institution or educator can take to improve achievement, retention, and satisfaction for freshman students. The steps are within the reach of any size institution and are not contingent on physical infrastructure or extensive financial resources.

These steps would focus existing administrative and faculty resources to create a campus that is friendly, open, efficient, and responsive to student needs. These steps would recruit, train, and properly reward a faculty that teaches using effective teaching practices. The faculty need to challenge students to higher orders of learning that go beyond simple recall to application and creation and is also applicable to their daily lives and careers. Faculty should not just present information, but structure their presentation to ensure maximum engagement with the material as well as significant retention through learning strategies.

A course designer or academic institution that focuses on these practices is potentially able to have enrolled students who are achieving at their maximum potential, content they have enrolled in the program, and would do so again if they had the opportunity.

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APPENDICES

NATIONAL SURVEY OF STUDENT ENGAGEMENT

THE COLLEGE STUDENT REPORT

During the current school year, about how often have you done the following?

Response options: Very often, Often, Sometimes, Never

- Asked questions or contributed to course discussions in other ways
- Prepared two or more drafts of a paper or assignment before turning it in
- Come to class without completing readings or assignments
- Attended an art exhibit, play, or other arts performance (dance, music, etc.)
- Asked another student to help you understand course material
- Explained course material to one or more students
- Prepared for exams by discussing or working through course material with other students
- Worked with other students on course projects or assignments
- Given a course presentation

During the current school year, about how often have you done the following?

Response options: Very often, Often, Sometimes, Never

- Combined ideas from different courses when completing assignments
- Connected your learning to societal problems or issues
- Included diverse perspectives (political, religious, racial/ethnic, gender, etc.) in course discussions or assignments
- Examined the strengths and weaknesses of your own views on a topic or issue
- Tried to better understand someone else's views by imagining how an issue looks from his or her perspective
- Learned something that changed the way you understand an issue or concept
- Connected ideas from your courses to your prior experiences and knowledge

During the current school year, about how often have you done the following?

Response options: Very often, Often, Sometimes, Never

- Talked about career plans with a faculty member
- Worked with a faculty member on activities other than coursework (committees,

student groups, etc.)
- Discussed course topics, ideas, or concepts with a faculty member outside of class
- Discussed your academic performance with a faculty member

During the current school year, how much has your coursework emphasized the following?

Response options: Very much, Quite a bit, Some, Very little
- Memorizing course material
- Applying facts, theories, or methods to practical problems or new situations
- Analyzing an idea, experience, or line of reasoning in depth by examining its parts
- Evaluating a point of view, decision, or information source
- Forming a new idea or understanding from various pieces of information

During the current school year, to what extent have your instructors done the following?

Response options: Very much, Quite a bit, Some, Very little
- Clearly explained course goals and requirements
- Taught course sessions in an organized way
- Used examples or illustrations to explain difficult points
- Provided feedback on a draft or work in progress
- Provided prompt and detailed feedback on tests or completed assignments

During the current school year, about how often have you done the following?

Response options: Very often, Often, Sometimes, Never
- Reached conclusions based on your own analysis of numerical information (numbers, graphs, statistics, etc.)
- Used numerical information to examine a real-world problem or issue (unemployment, climate change, public health, etc.)
- Evaluated what others have concluded from numerical information

During the current school year, about how many papers, reports, or other writing tasks of the following lengths have you been assigned? (Include those not yet completed.)

Response options: None, 1-2, 3-5, 6-10, 11-15, 16-20, More than 20 papers
- Up to 5 pages
- Between 6 and 10 pages
- 11 pages or more

During the current school year, about how often have you had discussions with people from the following groups?

Response options: Very often, Often, Sometimes, Never

- People of a race or ethnicity other than your own
- People from an economic background other than your own
- People with religious beliefs other than your own
- People with political views other than your own

During the current school year, about how often have you done the following?

Response options: Very often, Often, Sometimes, Never

- Identified key information from reading assignments
- Reviewed your notes after class
- Summarized what you learned in class or from course materials

During the current school year, to what extent have your courses challenged you to do your best work?

Response options: 1=Not at all to 7=Very much

Which of the following have you done or do you plan to do before you graduate?

Response options: Done or in progress, Plan to do, Do not plan to do, Have not decided

- Participate in an internship, co-op, field experience, student teaching, or clinical placement
- Hold a formal leadership role in a student organization or group
- Participate in a learning community or some other formal program where groups of students take two or more classes together
- Participate in a study abroad program
- Work with a faculty member on a research project
- Complete a culminating senior experience (capstone course, senior project or thesis, comprehensive exam, portfolio, etc.)

About how many of your courses at this institution have included a community-based project (service-learning)?

Response options: All, Most, Some, None

Indicate the quality of your interactions with the following people at your institution.

Response options: 1=Poor to 7=Excellent, Not Applicable

- Students
- Academic advisors
- Faculty
- Student services staff (career services, student activities, housing, etc.)
- Other administrative staff and offices (registrar, financial aid, etc.)

How much does your institution emphasize the following?

Response options: Very much, Quite a bit, Some, Very little

- Spending significant amounts of time studying and on academic work
- Providing support to help students succeed academically
- Using learning support services (tutoring services, writing center, etc.)
- Encouraging contact among students from different backgrounds (social, racial/ethnic, religious, etc.)
- Providing opportunities to be involved socially
- Providing support for your overall well-being (recreation, health care, counseling, etc.)
- Helping you manage your non-academic responsibilities (work, family, etc.)
- Attending campus activities and events (performing arts, athletic events, etc.)
- Attending events that address important social, economic, or political issues

About how many hours do you spend in a typical 7-day week doing the following?

Response options: 0, 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, More than 30 (Hours per week)

- Preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities)
- Participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.)
- Working for pay **on campus**
- Working for pay **off campus**
- Doing community service or volunteer work
- Relaxing and socializing (time with friends, video games, TV or videos, keeping up with friends online, etc.)
- Providing care for dependents (children, parents, etc.)
- Commuting to campus (driving, walking, etc.)

Of the time you spend preparing for class in a typical 7-day week, about how much is on *assigned reading*?

Response options: Very little, Some, About half, Most, Almost all

How much has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?

Response options: Very much, Quite a bit, Some, Very little

- Writing clearly and effectively
- Speaking clearly and effectively
- Thinking critically and analytically
- Analyzing numerical and statistical information
- Acquiring job- or work-related knowledge and skills
- Working effectively with others
- Developing or clarifying a personal code of values and ethics
- Understanding people of other backgrounds (economic, racial/ethnic, political, religious, nationality, etc.)
- Solving complex real-world problems
- Being an informed and active citizen

How would you evaluate your entire educational experience at this institution?

Response options: Excellent, Good, Fair, Poor

If you could start over again, would you go to the *same institution* you are now attending?

Response options: Definitely yes, Probably yes, Probably no, Definitely no

How many majors do you plan to complete? (Do not count minors.)

Response options: One, More than one

[If answered "One"] **Please enter your major or expected major:** [Text box]

[If answered "More than one"] **Please enter up to two majors or expected majors (do not enter minors):** [Text boxes]

What is your class level?

Response options: Freshman/first-year, Sophomore, Junior, Senior, Unclassified

Thinking about this current academic term, are you a full-time student?

Response options: Yes, No

How many courses are you taking for credit this current academic term?
Response options: 0, 1, 2, 3, 4, 5, 6, 7 or more

Of these, how many are *entirely online*?
Response options: 0, 1, 2, 3, 4, 5, 6, 7 or more

What have most of your grades been up to now at this institution?

Response options: A, A-, B+, B, B-, C+, C, C- or lower

Did you begin college at this institution or elsewhere?
Response options: Started here, Started elsewhere

Since graduating from high school, which of the following types of schools have you attended *other than* the one you are now attending? (Select all that apply.)

Response options: Vocational or technical school, Community or junior college, 4-year college or university other than this one, None, Other

What is the highest level of education you ever expect to complete?

Response options: Some college but less than a bachelor's degree, Bachelor's degree (B.A., B.S., etc.), Master's degree (M.A., M.S., etc.), Doctoral or professional degree (Ph.D., J.D., M.D., etc.)

What is the highest level of education completed by either of your parents (or those who raised you)?
Response options: Did not finish high school, High school diploma or G.E.D., Attended college but did not complete degree, Associate's degree (A.A., A.S., etc.), Bachelor's degree (B.A., B.S., etc.), Master's degree (M.A., M.S., etc.), Doctoral or professional degree (Ph.D., J.D., M.D., etc.)

What is your gender identity?

Response options: Man; Woman; Another gender identity, please specify ; I prefer not to respond

Enter your year of birth (e.g., 1994):

Are you an international student or foreign national?

Response options: Yes, No

What is your racial or ethnic identification? (Select all that apply.)

Response options: American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, Other, I prefer not to respond

Are you a member of a social fraternity or sorority?

Response options: Yes, No

Which of the following best describes where you are living while attending college?

Response options: Dormitory or other campus housing (not fraternity or sorority house), Fraternity or sorority house, Residence (house, apartment, etc.) ***within walking distance*** *to the institution, Residence (house, apartment, etc.)* ***farther than walking distance*** *to the institution, None of the above*

Are you a student-athlete on a team sponsored by your institution's athletics department?

Response options: Yes, No

Are you a current or former member of the U.S. Armed Forces, Reserves, or National Guard?

Response options: Yes, No

Have you been diagnosed with any disability or impairment?

Response options: Yes, No, I prefer not to respond

[If answered "yes"] **Which of the following has been diagnosed? (Select all that apply.)**

Response options: A sensory impairment (vision or hearing), A mobility impairment, A learning disability (e.g., ADHD, dyslexia), A mental health disorder, A disability or impairment not listed above

High-Impact Practice Items

Which of the following have you done or are currently doing?

- Participate in a learning community or some other formal program where groups of students take two or more classes together

- Participate in an internship, coo-op, field experience, student teaching, or clinical placement
- Participate in a study abroad program
- Work with a faculty member on a research project
- Complete a culminating senior experience (capstone course, senior project or thesis, comprehensive exam, portfolio, etc.)

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Fielding Graduate University, Santa Barbara, CA.2006. 20-credit hour Graduate Certificate: *Teaching in the Virtual Classroom.*

Columbia International University, Columbia, SC. 1981. M.Div.

Old Dominion University, Norfolk, VA. May 1977. B.S. Environmental Health

PROFESSIONAL EXPERIENCE

January 2015 to Present – Director of Rome with Purpose. A study abroad program for U.S. college students based in Rome, Italy, offering semester and May term programs in the humanities.

January 2015 to Present – Adjunct faculty, Geneva College, Beaver Falls, PA

April 2015-May 2016 – Instructional Design Consultant Emmaus Bible College, Dubuque, IA.

September 2002-January 2015 – Instructional Designer and Distance Education Consultant with Greater Europe Mission, Monument, CO. and Global Outreach International, Tupelo, MS. Assisted European Bible schools and seminaries to develop and launch distance education programs. The work was primarily focused in the countries of United Kingdom, Ireland, Portugal, Spain, Switzerland, Ukraine, and Romania.